8. Visual Dashboard: Performing Statistical Analyses with Visual Tools

Introduction

Visual Dashboard is one of the Epi Info™ 7 analysis modules. The Visual Dashboard is designed to be intuitive and simple to use. With the use of gadgets, the need for programming code is minimized. Data can be selected, sorted, listed or manipulated with the various gadgets in Visual Dashboard. The statistical analyses tools available in Visual Dashboard include frequencies, means, and more advanced statistical calculations processes (e.g., linear regression and logistic regression). Visual Dashboard has graphing functionality to display data as an Epi Curve, Pareto Chart, and several other bar and column charts.

Visual Dashboard can be accessed from the Epi Info™ 7 main window by clicking the Visual Dashboard button or by selecting **Tools > Analyze Data>Visual Dashboard** from the main page navigation menu. It can also be accessed from the toolbar menu of the Enter tool once data has been loaded into Epi Info™ 7.

Navigate the Visual Dashboard Workspace

The Visual Dashboard workspace contains four main areas: the canvas, Record Count/Data Source toolbar, Data Recoding and Formatting gadget (sometimes referred to as the Defined Variables gadget) and the Data Filters gadget.

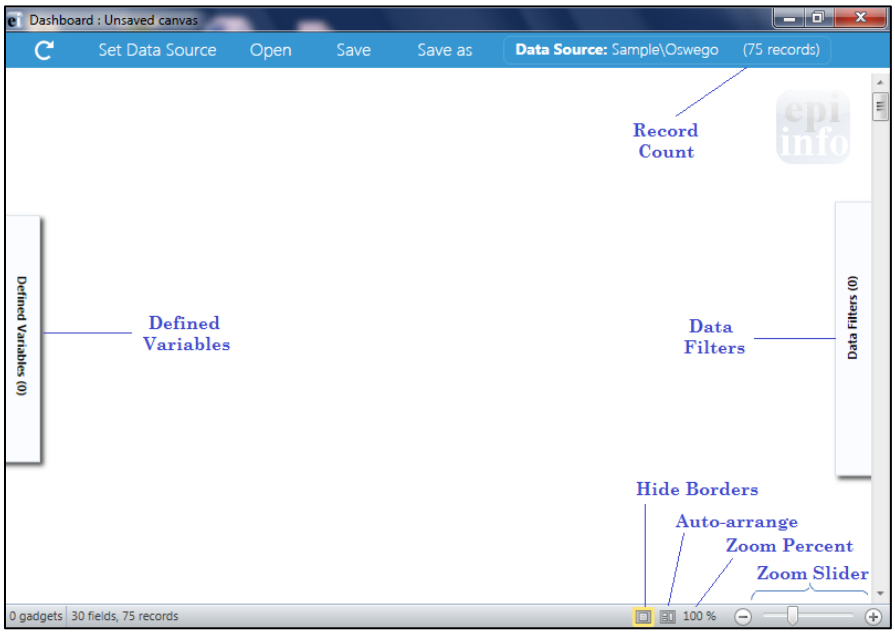


Figure 8.1: Visual Dashboard canvas

The **Visual Dashboard canvas** displays output generated by the multiple gadgets available in the tool. At the bottom right side of the Dashboard, the Hide Borders button turns off the external borders for each gadget giving the canvas a more report-like appearance. The Auto-arrange button positions the gadgets on the canvas to maximize the display area. The Zoom Percent and Zoom Slider allow you to zoom in and out of the canvas. The gadgets that get loaded automatically after a dataset has been uploaded are:

1. The **Record Count/Data Source**, located in the toolbar at the top of the screen, displays the source and record count of the data being analyzed. The number of fields (columns) in your dataset will be displayed on the bottom left of the status strip.
2. The **Data Recoding and Formatting Gadget (Defined Variables)**, allows for the creation, editing, and deletion of variables created during the analysis session. This gadget is located on the left-hand side of the screen.
3. The **Data Filtering Gadget (Data Filters)**, which is a canvas wide filter, is on the right-hand side of the screen and used to select a subset of data for analysis.

Gadget Filters and Settings

In addition to setting canvas wide filters, you can also set a gadget-specific filter using the widgets at the top of the gadget. The widgets and borders disappear when the "Hide Borders" button is pressed.

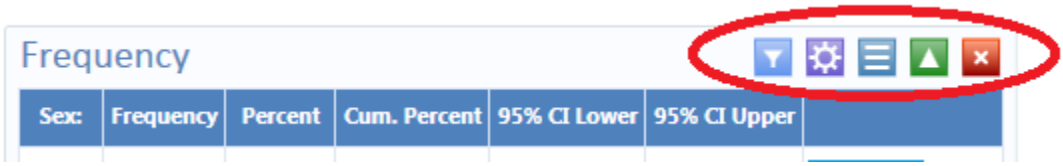


Figure 8.2: Gadget widgets

1. The funnel icon on the gadget's header panel works the same way as the canvas-wide filters (Defined Variables gadget and Data Filters gadget), except that: (1) Advanced mode is not available, and (2) the filtering applies only to that gadget. An important point to note is that gadget filters are combined with canvas filters. E.g. if the canvas filter is 'Age > 20' and the gadget filter is 'ILL = Yes', then the filter applied to the gadget is 'Age >20 AND ILL = Yes'. Some gadgets do not have filtering capabilities, such as the advanced statistics.
2. The purple button collapses and expands the gadget's properties.
3. The middle button (with the three lines) on the gadget header panel sets a gadget's title and description. The title and description are displayed when the dashboard is exported in HTML format.
4. The green up/down arrow on the gadget's header panel collapses and expands the gadget's output, which is useful when you want to minimize the amount of gadgets that are displayed on the canvas.
5. You may exit the gadget by clicking on the red "X" at the top right of the header panel.

Canvas Properties

Canvas properties, which can be accessed by right clicking on the canvas and selecting **Canvas Properties** from the menu options, are used to:

- Change the data source properties by selecting a new project and table
- Change HTML output properties and create a custom title, summary, and conclusion for your Visual Dashboard output
- View miscellaneous information about your data such as number of rows and columns, and cached information

Note: Changing the data source is not advisable except for advanced users.

Save and Open a Canvas

The current canvas including data source, gadgets, filters, and user-defined variables may be saved and reused later. Saved canvases may be opened later with the Visual Dashboard tool. This will allow you to reconnect to the data source without having to manually apply the filters again.

To save a canvas, right click on the canvas and select **Save Canvas**.

- If the canvas was previously saved and named, this will overwrite the existing file.
- A canvas being saved for the first time will follow the process outlined in the 'Save As' option. Epi Info™ 7 requires a "save to" location and a file name.

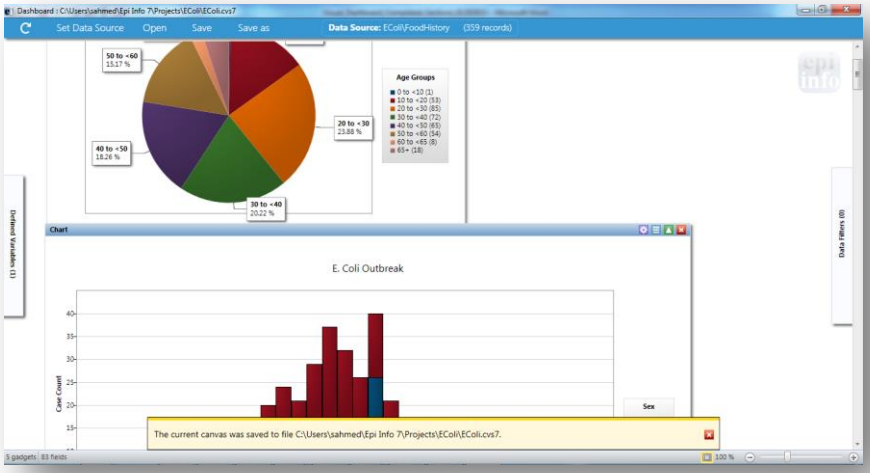


Figure 8.3: Saving Canvas

The yellow message at the bottom of the screen confirms the canvas was saved successfully.

Save Canvas As

The **Save Canvas As** option allows the canvas to be saved for the first time or saved to a new location.

1. Right click on the canvas, select **Save Canvas As**. The **Save As** dialog box appears.
2. Select a location to save the canvas to and enter a File Name.
3. Click **Save**.

Note: If a file with the same name already exists, an error message will appear asking if you would like to replace existing file.

Open Canvas

Open an existing Visual Dashboard canvas by performing the following steps:

1. Right click on the canvas and select **Open Canvas**. The **Open Canvas** dialog box appears.

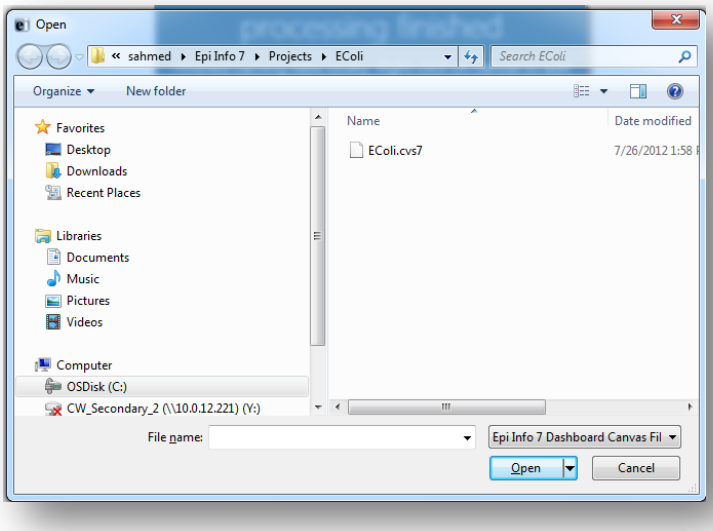


Figure 8.4: Open a Canvas

2. Select the location of the canvas file. The file can be identified by the file name extension (**.cvs7**).
3. Click **Open.** The canvas file appears in Visual Dashboard.

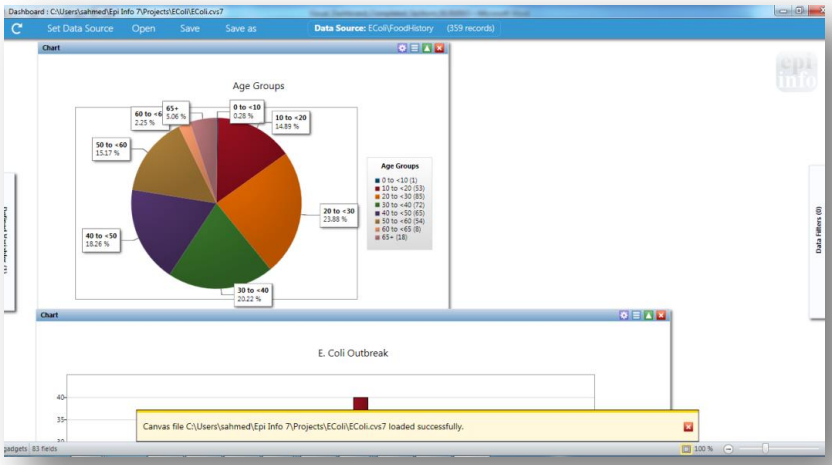


Figure 8.5: Opened Canvas

The yellow message at the bottom of the screen confirms the canvas loaded successfully.

Save Visual Dashboard HTML

Output from the gadgets may be saved as an HTML document. To save the current output:

1. Right click on the canvas, select **Save Output as HTML**. The **Save As** dialog box appears.
2. Select a location to save the canvas and enter a File Name. Select **HTML File** from the **Save as Type** drop-down list.

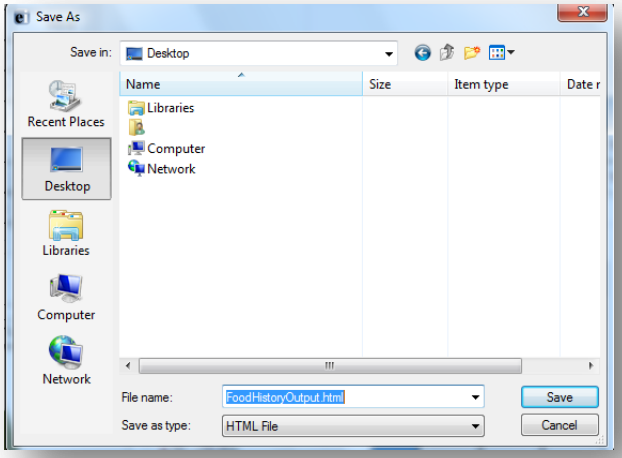


Figure 8.6: Save Output as HTML

3. Click the **Save** button. The output automatically opens in the web browser.

Note: HTML documents can only be opened in a web browser and cannot be used to re-create the Visual Dashboard canvas.

Send Visual Dashboard Output To

Outputs from Visual Dashboard may be viewed in either Microsoft Word or Microsoft Excel with the **Send Output To** option. You must have Microsoft Word or Microsoft Excel installed to use either option.

Microsoft Excel

1. Right click on the canvas, select **Send Output To > Microsoft Excel**.
2. The **Visual Dashboard** output opens in **Microsoft Excel**.

Note: Charts are not included with the output when sent to Excel.

Microsoft Word

1. Right click on the canvas, select **Send Output To > Microsoft Word**.

2. The **Visual Dashboard** output opens in **Microsoft Word** as an .html formatted web document. If saved in this format, charts are saved separately to a sub-folder. To share this .html file, remember to share the subfolder as well. Alternatively, change the format to a Microsoft Word .docx format so the charts are included with the file as embedded images.

Managing Data

Selecting a Data Source

Before beginning analysis in Visual Dashboard, select a data source. Data from the following sources can be analyzed in Visual Dashboard: Epi Info™ 7 project files, ASCII Text files, Microsoft Excel, Microsoft Access, Microsoft SQL Server, MySQL, and PostgreSQL. Follow one of the first three steps below to select a data source:

1. Click on the **Set Data Source** option from the bar at the top of the screen.

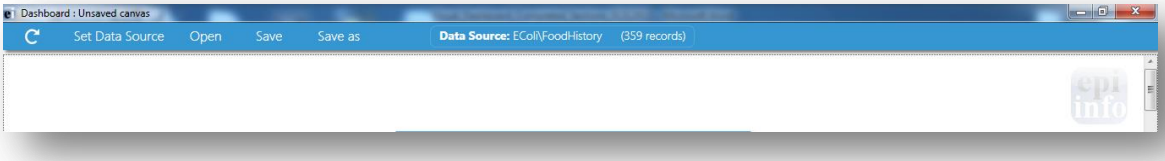


Figure 8.7: Visual Dashboard toolbar

2. Click the arrow in the blue box next to **Set a Data Source Now**.

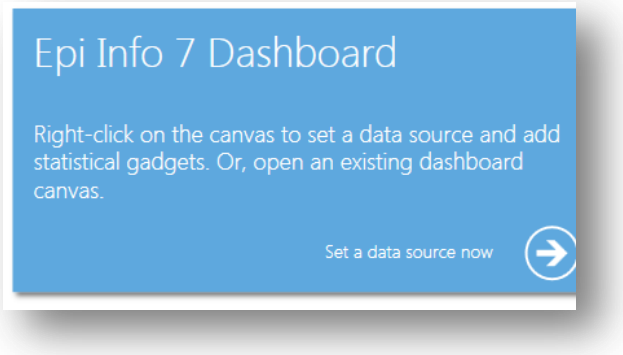


Figure 8.8: Set Data Source option

3. Right-click on the canvas and select **Set Data Source** from the menu options.
4. After selecting the **Set Data Source** option, the **Select Data Source** dialog box appears. Select a **Database Type**, **Data Source**, and form to open data in Visual Dashboard.

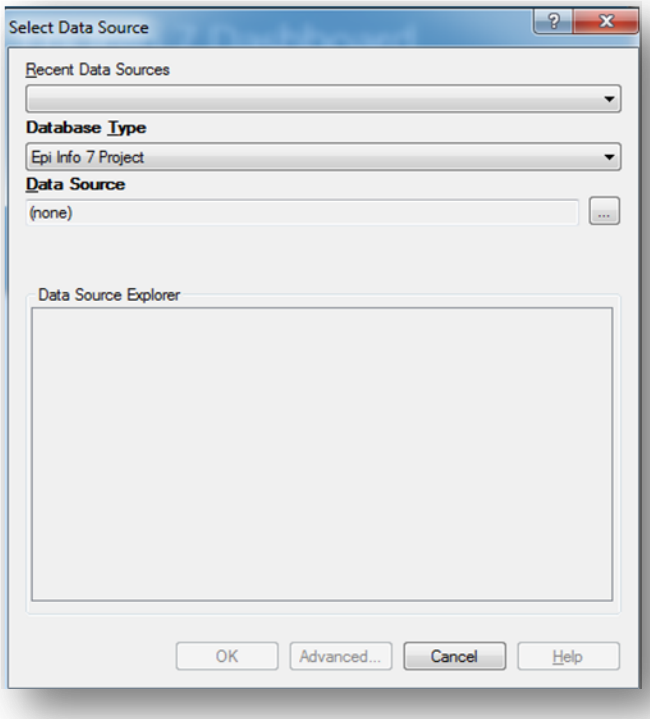


Figure 8.9: Select Data Source dialog box

- The **Recent Data Sources** field provides a list of recently accessed databases in Classic Analysis or Visual Dashboard. By selecting one of the data sources available on the list, you do not need to provide Database Type or Data Source information. If you are reading an Epi Info™ 7 project file from the Data Source section, all available forms will appear in the Data Source Explorer box.
- The **Database Type** field indicates the database file to be loaded (.PRJ, .MDB, .XLS). Specify the data format for the data being accessed. Unless otherwise specified, output files are stored in this destination folder as well.
- The **Data Source** field indicates the file location/path. If you use an SQL Server database, the Data Source field will require server and database names.
- The **Data Source Explorer** field allows you to select a form in your project. This reads the data table associated with your form.
- The **Advanced** mode allows the use of SQL queries to select the data source. Only SELECT statements are allowed.

Read an Epi Info™7 Project File

1. Click on the **Set a Data Source now** arrow. The **Select Data Source** dialog box appears.
2. From the **Database Type** drop-down list, select **Epi Info 7 Project.**

3. In the **Data Source** field, click on the **ellipsis** button and the **Epi Info 7 Project** folder appears.
4. Browse for the project file that you would like to import into Visual Dashboard.
5. Click **Open.**
6. The **Data Source Explorer** box populates with a list of all the forms that are associated with the project. Select a form.
7. Click **OK**. The record count and data source appear in the tool bar at the top of the Visual Dashboard canvas.

Read a Microsoft Excel File

1. Click on the **Set a Data Source now** arrow. The **Select Data Source** dialog box appears.
2. From the **Database type** drop-down list, select either **MS Excel 97-2003 Workbook** or **MS Excel 2007 Workbook.**
3. In the **Data Source** field, click on the **ellipsis** button and the **Open Existing File** dialog box appears.
4. Enter the filename and path to open your workbook or click on the **ellipsis** button to browse for the **MS Excel workbook** (.xls or .xlsx).
5. Click **Open.** The "First row contains Field Names" checkbox is selected by default. If this option is unchecked, data will be imported without column headings.
6. Click **OK**. Select a **worksheet** from the list provided in the Data Source Explorer.
7. Click **OK**. The record count and data source appear in the menu bar at the top of the Visual Dashboard canvas.

Read a Microsoft Access File

1. Click on the **Set a Data Source now** arrow. The **Select Data Source** dialog box appears.
2. From the **Database Type** drop-down list, select either **MS Access 2002-2003 (.mdb)** or **MS Access 2007(.accdb).**
3. In the **Data Source** field, click on the **ellipsis** button and the **Open Microsoft Access File** dialog box appears.
4. Enter the filename and path to open your file or click on the **ellipsis** button to browse for the **MS Access file (.mdb or .accdb)**. If the file is password protected, enter the password.
5. Click **OK.**
6. Select a **data table** from the list provided in the **Data Source Explorer**.

7. Click **OK**. The record count and data source appear in the menu bar at the top of the Visual Dashboard canvas.

Read an ASCII Text File

1. Click on the **Set a Data Source now** arrow. The **Select Data Source** dialog box appears.
2. From the **Database Type** drop-down list, select **Flat ASCII File**.
3. In the **Data Source** field, click the **ellipsis** button to browse.
4. Click the **ellipsis** button in the **Flat File** location dialog box to browse the directory of the ASCII file
5. Click **OK**. Note that the First row contains header information box is checked by default. If the first row of the file does not contain header information, deselect the checkbox. If this option is unchecked, data will be imported without column headings.
6. Select the **file name** from the list provided in the **Data Source Explorer**.
7. Click **OK.** The record count and data source appear in the menu bar at the top of the Visual Dashboard canvas.

Read a SQL Server Database

Note: You must have Microsoft SQL Server installed on your computer or you must have access to a server over a network to perform this function.

1. Click on the **Set a Data Source now** arrow. The **Select Data Source** dialog box appears.
2. From the **Database Type** drop-down list, select **Microsoft SQL Server Database**.
3. In the **Data Source** field, click the **ellipsis** button to browse.
4. The **Connect to SQL Server** database dialog box opens. Specify the **Server name** and **Database name** to connect to a SQL Server database.
5. The Use Windows Authentication radio button is selected by default. You can use **SQL Server Authentication** by checking the corresponding radio button and then entering Login and Password credentials.
6. Click **OK**.
7. From the list provided in the **Data Source Explorer**, select a **data table**.
8. Click **OK.** The record count and data source appear in the menu bar at the top of the Visual Dashboard canvas.

Read a MySQL Server Database

Note: You must have MySQL Server installed on your computer or you must have access to a server over a network to perform this function.

1. Click on the Set Data Source arrow. The Select Data Source dialog box appears.
2. From the **Database Type** drop-down list, select **MySQL Database**.
3. In the **Data Source** field, click the **ellipsis** button to browse SQL databases.
4. The **Connect to MySQL** database dialog box appears. Enter the **Server name**, **Database name**, **Username** and **Password** to connect to the MySQL database. You can select **<Browse for more>** from the **Server name** drop-down list to select a MySQL server instance in your network.
5. Click **OK**.
6. From the list provided in the Data Source Explorer, select a **data table**.
7. Click **OK.** The record count and data source appear in the menu bar at the top of the Visual Dashboard canvas.

Add a Related Data Source

Analysis in Visual Dashboard may be performed on data from multiple data sources. The **Add a Related Data Source** option links one or more tables using a common identifier to find matching records. The form/table to be linked requires a key field that relates records in the two forms/tables together. The keys in the main and related tables or forms do not require the same name. If the table was created in Form Designer and the data entry was completed using Enter, Visual Dashboard can establish a relationship by using the Global Record ID and Foreign Key variables created by Epi Info™ 7. The example below demonstrates how to add a related data source.

Epi Info™ 7 contains a related database in the Sample.PRJ file with two forms: Surveillance and RHepatitis. The variable GLOBAL RECORD ID is the internal Epi Info™ 7 identification key located in more than one form in the project.

1. Select the **Sample.PRJ** Data Source. Open **Surveillance**.
2. Right click on the canvas and select **Add related data source**. The **Select Data Source** dialog box opens.
3. Select **RHepatitis** from the list of forms in the Data Source Explorer. The **Child Key Field** drop-down list populates.
4. From the **Parent Key Field** drop-down list, select **GLOBALRECORDID**.
5. From the **Child Key Field** drop-down list, select **FKEY**.
6. Click **OK**. The related form information appears on the canvas. Data from the two tables can now be used for analysis.

Note: You can only perform a one-to-one analysis with a related table in Visual Dashboard. To perform a one-to-many analysis, please see the Classic Analysis section of this user guide.

Managing Variables

The Data Recoding and Formatting Gadget in Visual Dashboard allow you to create, edit, or delete variables with no coding. To access the Data Recoding and Formatting gadget, move your mouse over Defined Variables on the left-hand side of the screen.

Creating a New Variable

Project data are not always in the proper format needed for analysis. As an example, a patient's age may be entered in a questionnaire but the ages may need to be in five-year increments for proper analysis. The data may contain county codes, but descriptive county names may be more useful for analysis. Creating a new variable is one of the functions of the Data Recoding and Formatting gadget. By creating a new variable, the ages of patients can be recoded to five-year increments, or county names may be assigned to the county codes making the data useful for analysis. A new variable may be created to change the format of existing data with recoded value, simple assignment, formatted value, assigned expression, or by grouping existing variables.

Recoded Value

The New Variable with Recoded Value option assigns a new value to existing data and places the results in defined variables. The **Add Recoded Variable** dialog box is pictured below.

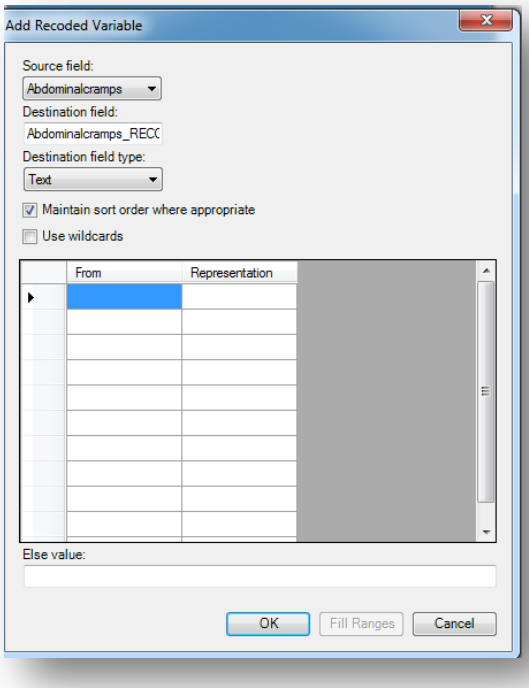


Figure 8.10: Add Recoded Variable Options

- The **Source field** drop-down list represents the column in the current data source that will have its values recoded.
- The **Destination field** drop-down list represents a new column that will be temporarily created in the current data source that will store the recoded values.
- The **Destination field type** represents the data type of the new column that will be created to store the recoded values. The available options are text, numeric, or Yes/No.
- The **Maintain Sort Order Where Appropriate** is checked by default. Usually output in Visual Dashboard is sorted alphabetically or sequentially. Leave this box checked if you would like the output to remain sorted exactly in the sequence that the data was entered.
- The **Use Wildcards** option can be used for text searches in the FROM column below. This option is unchecked by default. The asterisk (*) is the wildcard character.
- The **From** column identifies the bottom of a range of values or a single value. To recode a single value instead of a range, use this From column only and ignore the To column. When used to recode a range of values, the recode range includes the value in the From column and extends up to, but not including the value in the To column. To recode all unspecified values, leave both From and To columns blank.

- **To** value (if any) identifies the upper limit of a range of values to be recoded. The recode range does not include the value in the To column. This option only appears if a numeric variable is selected.
- The **Else Value** represents an optional value to assign to any records that do not match the recoding rules above. If left blank, unmatched records will be left null.
- **Representation Value** identifies the value to be assigned to the destination variable for the specified values of the source variable.
- **Fill Ranges** can be used to automatically populate range values on a numeric source field and is a very quick way to create numeric groupings such as age categories.
- **OK** accepts the current settings and data, and closes the form or window.
- **Cancel** exits the window without saving or executing a command.

The example below demonstrates how to add a recoded variable:

In the E. coli Food History table, there are over 60 different values for Age. When performing an analysis, it is difficult to compare all of the different age values. By grouping the age values in 10-year increments, analysis on this variable is simplified. To group the values in Age groupings or categories:

1. Select the **EColi.PRJ** Data Source.
2. From the Form section, click **FoodHistory**. Click **OK**.
3. On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
4. Click the **New Variable** button.
5. Select **With Recoded Value**. The **Add Recoded Variable** dialog box appears.

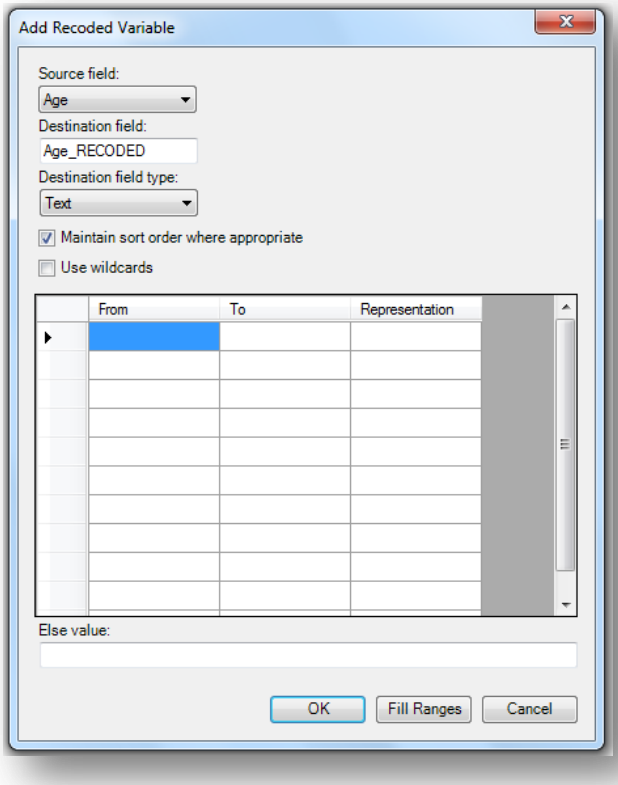


Figure 8.11: Add Recoded Variable dialog box 2

6. From the **Source field** drop-down list, select **Age**.
7. Click the **Fill Ranges** button. The **Fill Ranges** dialog box appears.
8. Enter **0** for the **Start value**, **65** for the **End value**, and **10** for **By**.

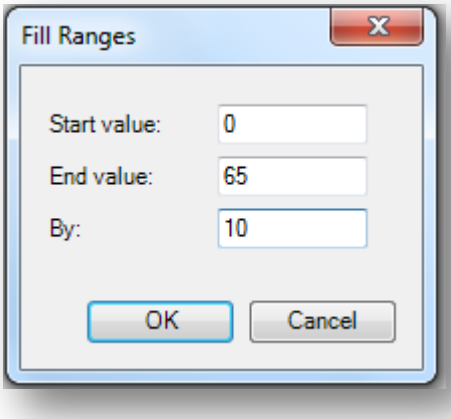


Figure 8.12: Add Recoded Variable/Fill Ranges

9. Click **OK**. The **Add Recoded Variable** dialog box appears with the **From**, **To**, and **Representation** columns populated.

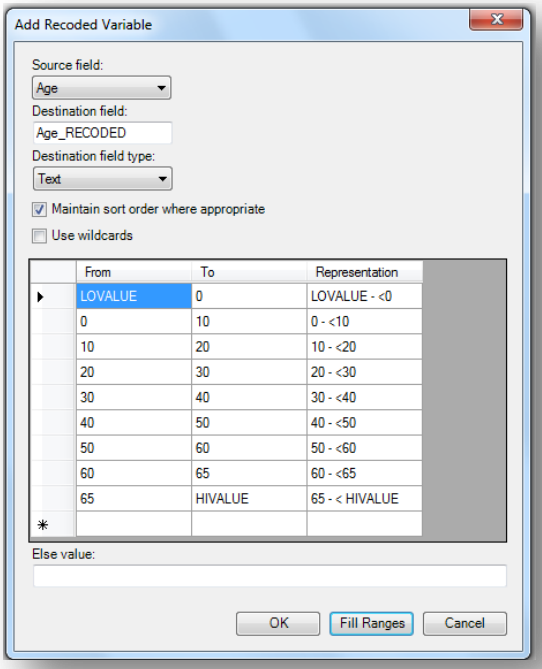


Figure 8.13: Add Recoded Variable Ranges Populated

10. Click **OK**. The variables are recoded and the conditions appear in the **Variable Definitions** textbox.

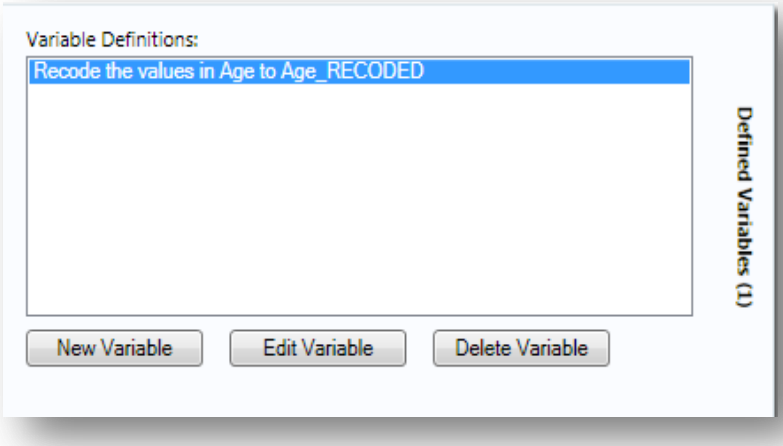
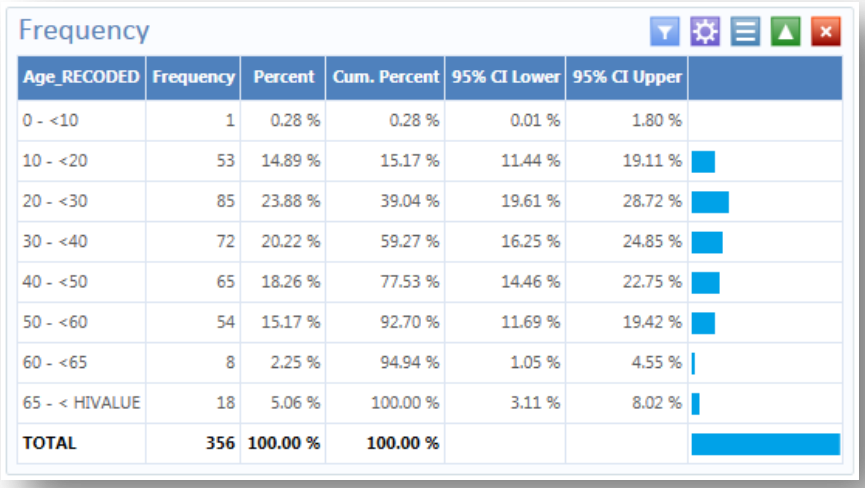


Figure 8.14: Variable Definitions dialog box

To see the frequency of Age_RECODED in line list view, right click on the canvas, and then select **Add Analysis Gadget > Frequency**. Select **Age_RECODED** from the **Frequency**

of drop-down list and then click **Run.** For information regarding the Analysis Gadget, refer to the Displaying Statistics and Records section.



Frequency

Age_RECODED	Frequency	Percent	Cum. Percent	95% CI Lower	95% CI Upper
0 - <10	1	0.28 %	0.28 %	0.01 %	1.80 %
10 - <20	53	14.89 %	15.17 %	11.44 %	19.11 %
20 - <30	85	23.88 %	39.04 %	19.61 %	28.72 %
30 - <40	72	20.22 %	59.27 %	16.25 %	24.85 %
40 - <50	65	18.26 %	77.53 %	14.46 %	22.75 %
50 - <60	54	15.17 %	92.70 %	11.69 %	19.42 %
60 - <65	8	2.25 %	94.94 %	1.05 %	4.55 %
65 - < HIVALUE	18	5.06 %	100.00 %	3.11 %	8.02 %
TOTAL	**356**	**100.00 %**	**100.00 %**		

Figure 8.15: Age_Recoded Line List

The Age_Recoded variable contains eight distinct values, which makes analysis easier.

Simple Assignment

Simple Assignment will assign the value of an existing variable to a newly defined variable. The example below demonstrates Simple Assignment.

1. Select the **Sample.PRJ** Data Source.
2. From the Data Source Explorer menu, select **Surveillance**. Click **OK**.
3. On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
4. Click the **New Variable** button.
5. Select **With Simple Assignment**. The **Simple Assignment** dialog box appears.

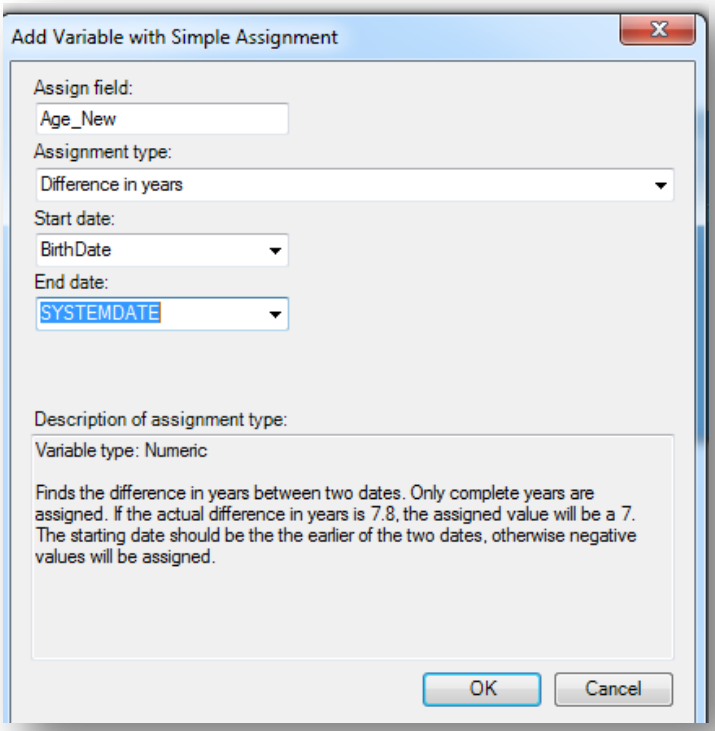


Figure 8.16: Add Variable with Simple Assignment Options

6. In the Assign field, enter **Age_New**.
7. Select **Difference in years** from the **Assignment type** drop-down list.
8. Select **BirthDate** from the **Start Date** drop-down list.
9. Select **SYSTEMDATE** from the **End Date** drop-down list. The System Date is a system-level variable that represents the current date and time on your computer.
10. Click **OK**. A description of the assignment appears in the **Variable Definitions** textbox.

To see the **Age_New** variable in line list view, right click on the canvas and then select **Add Analysis Gadget > Line List**. Select **Age_New** from **List of Variables to display** and then click **Generate Line List.**

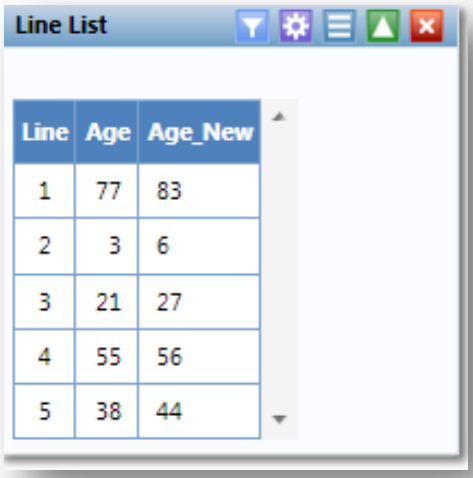


Figure 8.17: Simple Assignment Line List

In this example, the current age of the patient is calculated from the difference between the birth date and today's date. The **Analysis Gadget > Line List** view displays the new variable created via Simple Assignment. For information regarding the Analysis Gadget, refer to the Displaying Statistics and Records section.

Conditional Assignment

Conditional Assignment defines conditions and one or more events that occur if the specified conditions are met. An alternative event can be given after the ELSE statement. The ELSE statement will be executed if the first set of conditions is not true. If the condition is true, the first event is executed. If the statement is false and no ELSE statement is selected, the statement is bypassed.

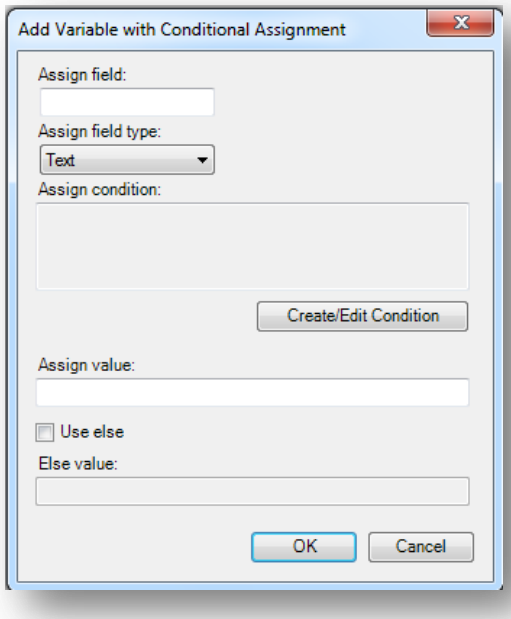


Figure 8.18: Add Variable with Conditional Assignment

- **Assign Field** indicates the new variable name.
- **Assign Field Type** indicates the format of the new variable. The available options are Text, Numeric, or Yes/No.
- **Assign Condition** determines whether subsequent commands will be run. If the condition specified in this textbox is true, the Assign Value will be applied.
- **Assign Value** states the value of the new variable when the Assign Condition is true.
- **Use Else** checkbox indicates whether an Else Value is specified. This checkbox is unmarked by default.
- The **Else Value** is applied when the statement in the Assign Condition textbox is false.

In the following example, the **YoungAdult** variable will be conditionally assigned the value of **Yes** if the Age variable has a value between (but not including) 17 and 30. If the Age value falls outside of this range, a value of **No** will be assigned to YoungAdult.

1. Select the **Sample.PRJ** Data Source.
2. From the **Data Source Explorer** menu, select **Surveillance**. Click **OK**.
3. On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
4. Click the **New Variable** button.
5. Select **With Conditional Assignment**. The **Add Variable with Conditional Assignment** dialog box appears.

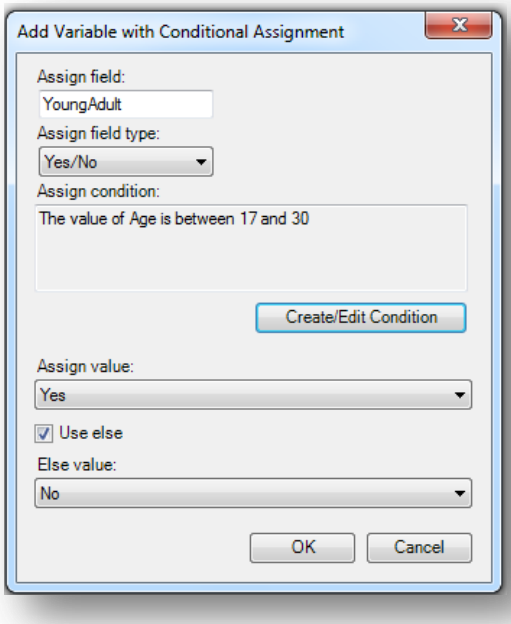


Figure 8.19: Conditional Assignment/ Create Edit Condition

6. In the Assign field, enter **YoungAdult**.
7. Select **Yes/No** from the **Assign field type** drop-down list.
8. Click on the **Create/Edit Condition** button. The **Specify Assign Condition** dialog box appears.

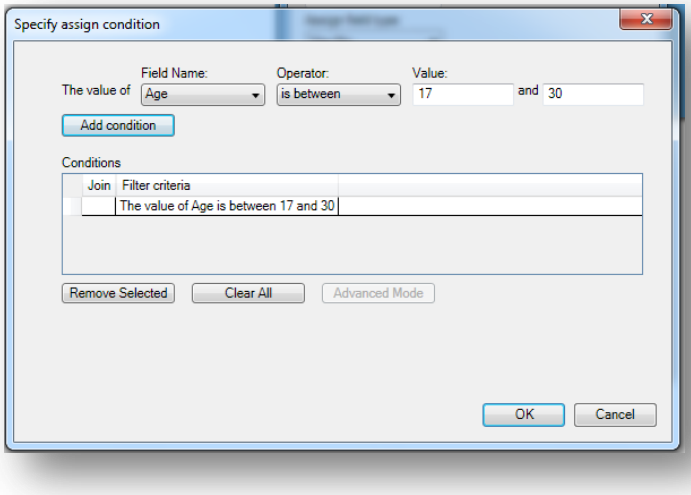


Figure 8.20: Conditional Assignment Add Condition

9. Select **Age** from the **Field Name** drop-down list.
10. Select **is between** from the **Operator** drop-down list.
11. Enter **17** and **30** for Values. Click **Add Condition**.

12. Click **OK**. The **Add Variable with Conditional Assignment** dialog box appears.
13. The condition now appears in the **Assign Condition** textbox.
14. Select **Yes** from the **Assign Value** drop-down list.
15. Check the **Use Else** checkbox.
16. Select **No** from the **Else Value** drop-down list.
17. Click **OK**. A description of the assignment appears in the **Variable Definitions** textbox.

To see the **YoungAdult** variable in line list view, right click on the canvas and then select **Add Analysis Gadget > Line List**. Select **YoungAdult** from **List of Variables to display** and then click **Generate Line List.**

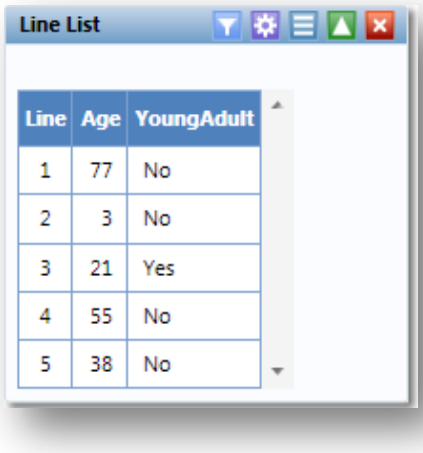


Figure 8.21: Conditional Assignment Line List

Note: The Else clause at the end of the IF statement is important to specify what should happen if the conditions are not met. Without the Else clause, YoungAdult would be null or missing for any values falling outside the 17 to 30 range. For information regarding the Analysis Gadget, refer to the Displaying Statistics and Records section.

Formatted Value

The format and name of an existing variable may be changed with the Formatted Value option. This is currently only useful with dates as demonstrated by the example below.

1. Select the **Sample.PRJ** Data Source.
2. From the **Data Source Explorer** menu, select **Surveillance**. Click **OK**.
3. On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
4. Click the **New Variable** button.
5. Select **With Formatted Value**. The **Add Formatted Value** dialog box appears.

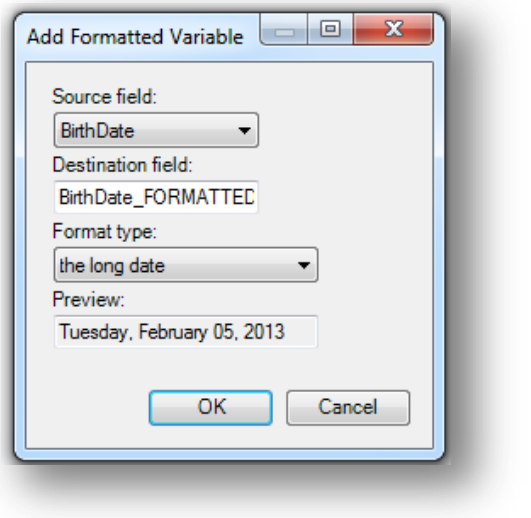


Figure 8.22: Add Formatted Variable Options

6. Select **BirthDate** from the **Source field** drop-down list.
7. The Destination field automatically shows the source field with a suffix of "FORMATTED". Modify the name of the Destination field as needed.
8. Select **the long date** from the **Format type** drop-down list. Using the current system date, a sample long date value appears in the Preview field. The current system date is used for the preview.
9. Click **OK**. A description of the assignment appears in the **Variable Definitions** textbox.

To see the **BirthDate_FORMATTED** variable in line list view, right click on the canvas and then select **Add Analysis Gadget > Line List**. Select **BirthDate_FORMATTED** from **List of Variables to display** and then click **Generate Line List.**

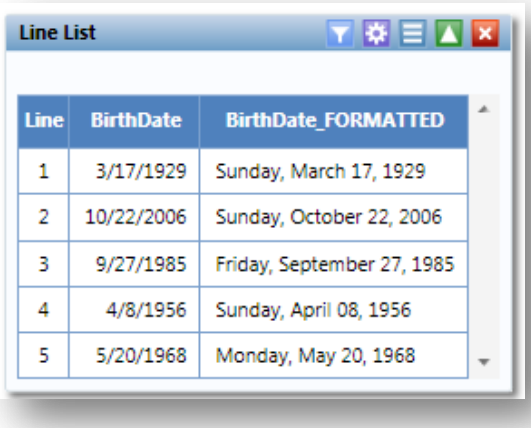


Figure 8.23: Formatted Variable Line List

The **Analysis Gadget > Line List** view displays the new variable created via Formatted Value. For information regarding the Analysis Gadget, refer to the Displaying Statistics and Records section.

Assigned Expression

Assigned Expression assigns the result of an expression or the field value to a variable as demonstrated in the example below. In the following example, the zip code field is a number. To use the zip code in a map, a new zip code variable must be defined and assigned text values.

1. Select the **Sample.PRJ** Data Source.
2. From the **Data Source Explorer** menu, select **Surveillance**. Click **OK**.
3. On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
4. Click the **New Variable** button.
5. Select **With Assigned Expression**. The **Add Variable with Expression** dialog box appears.

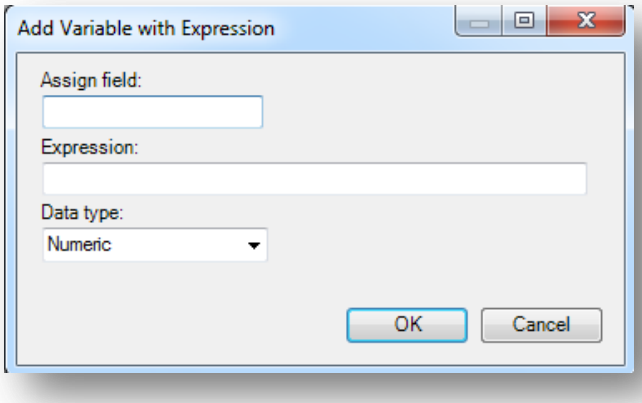


Figure 8.24: Add Variable with Expression

6. In the **Assign Field**, enter **Zip2**.
7. In the **Expression** field, type the syntax: **ZipCode + '-0000'**.
8. Select **Text** from the **Data type** drop-down list.
9. Click **OK**. The assignment appears in the Variable Definition textbox.

To see the **Zip2** variable in line list view, right click on the canvas and then select **Add Analysis Gadget > Line List**. Select **Zip2** from **List of Variables to display** and then click **Generate Line List.** For information regarding the Analysis Gadget, refer to the Displaying Statistics and Records section.

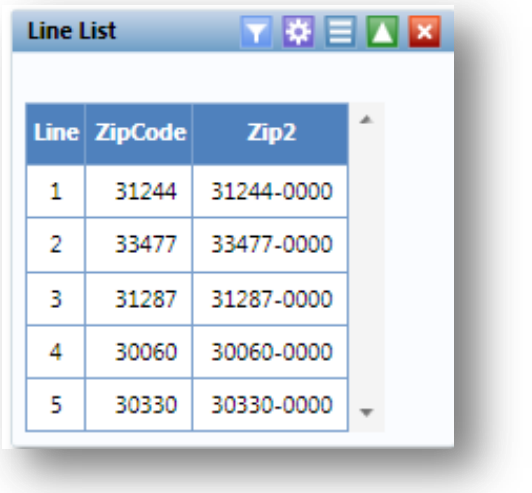


Figure 8.25: Add Variable with Expression Line List

Creating a Variable Group

The Create variable group option in Visual Dashboard allows for the temporary grouping of variables. This option is useful when there are many variables and analyzing each is impractical. Group variables can be used in the Combined Frequency and MxN/2x2 gadgets. The example below demonstrates how to create a variable group.

1. Select the **Sample.PRJ** Data Source.
2. From the **Data Source Explorer** menu, select **Oswego**. Click **OK**.
3. On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
4. Click the **New Variable** button.
5. Select **Create Variable Group.** The **Create Group** dialog box appears.

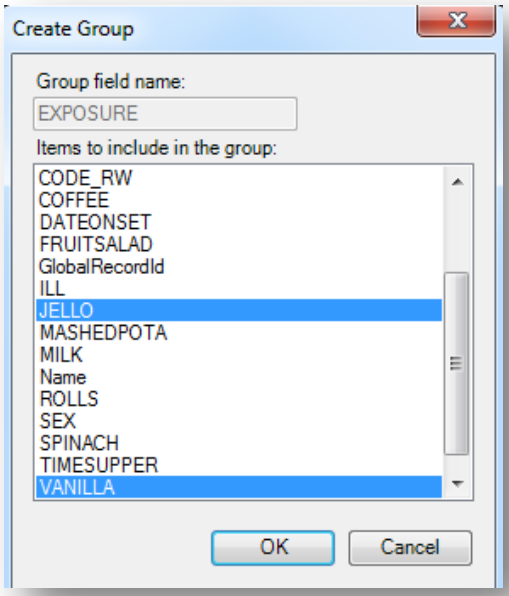


Figure 8.26: Create Group Variable Options

6. In the Group field name, enter **Exposure**.
7. Select **Jello** and **Vanilla** from the **Items to include in the group** list. Hold down the **Ctrl** key on your keyboard to select more than one variable at a time.
8. Click **OK**.
9. The variable group statement now appears in the **Variable Definitions** textbox.

Edit Variable

Edit Variable allows an existing variable definition to be changed. The following example will add a new variable to the Exposure group variable created above.

1. On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
2. Click the **Edit Variable** button.

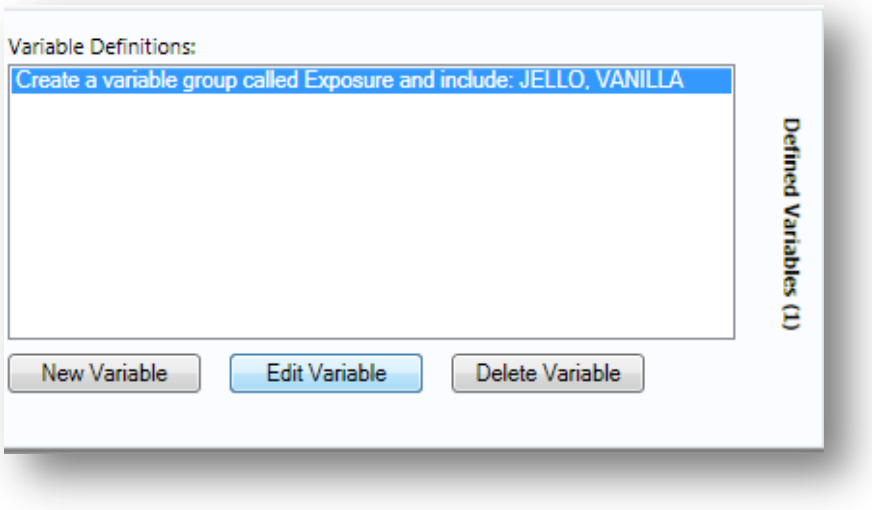


Figure 8.27: Defined Variable/Edit Variable

3. The **Create Group** dialog box appears.
4. Press and hold the **Ctrl** key on your keyboard and select **Spinach**.
5. Click **OK**.
6. The Exposure variable group now includes Spinach, which appears in the Variable Definitions text box.

Delete Variable

The Delete Variable option in the Data Recoding and Formatting Gadget removes a defined variable from the system. In the example below, the Exposure group variable will be deleted.

1. On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
2. Select the **Exposure** variable definition.

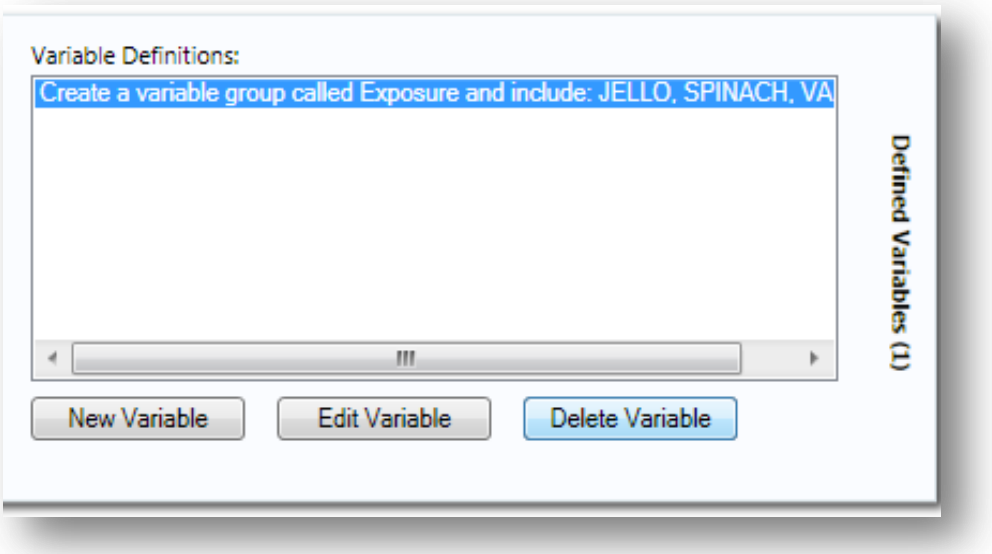


Figure 8.28: Defined Variable/Delete Variable

3. Click on the **Delete Variable** button.
4. The variable is deleted from the **Variable Definitions** text box.

Adding and Removing Data Filters

Add a Filter

Visual Dashboard typically opens all records in a file. The Data Filter Gadget in Visual Dashboard allows you to select a subset of data by specifying certain conditions. This is useful when trying to analyze a specific group of records. There are two modes in this gadget; guided and advanced. The Guided Mode allows you to apply conditions by selecting values from Field Name, Operator, and Value drop-down lists. Filters may be applied in the Advanced Mode by entering the filtering conditions in the free form text box. To add a filter, follow the steps below.

1. Select the **EColi.PRJ** Data Source.
2. From the **Data Source Explorer** menu, click **FoodHistory.**
3. Click **OK.**
4. From the right-hand side of the Visual Dashboard canvas, move the mouse over the **Data Filter** gadget. The gadget expands outwards.
5. From the **Field Name** drop-down list, select **Ill**.
6. From the **Operator** drop-down list, select **is equal to**.
7. From the **Value** drop-down list, select **Yes**.

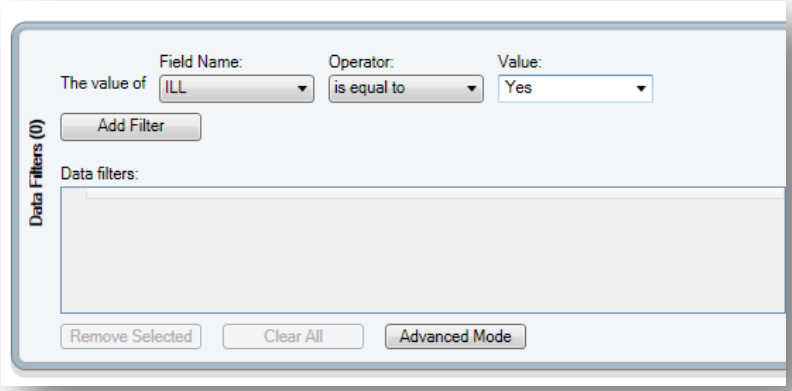


Figure 8.29: Data Filter Gadget/Add Filter

8. Click the **Add Filter** button. The filter condition is added to the Data filters grid view.

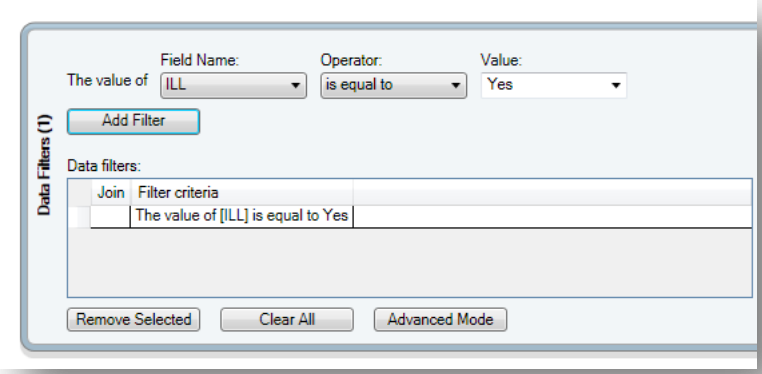


Figure 8.30: Data Filter Gadget/Add Filter with Condition

If a filter condition is added or removed, all gadgets on the canvas will automatically refresh. The record count at the top now reads **276**, indicating that there are 276 out of 359 records where the value of ILL is Yes.

Follow the steps below to add an additional filter:

1. On the right-hand side of the Visual Dashboard canvas, move the mouse over the **Data Filter** gadget. The gadget expands outwards.
2. From the **Field Name** drop-down list, select **Age**.
3. From the **Operator** drop-down list, select **is between**.
4. From the **Value** text boxes, type **20** for the first box.
5. From the **Value** text boxes, type **29** for the second box.

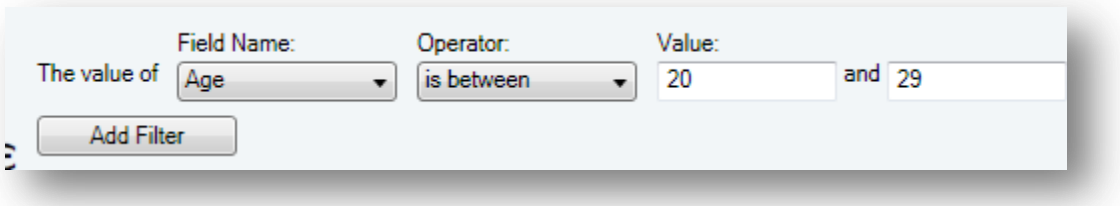


Figure 8.31: Data Filter Gadget/Add Filter/Specify Condition

6. Click **Add Filter**. A context menu appears asking if you want to add this condition using an AND or an OR.
7. Select the **AND** option. The filter condition is added to the Data filters grid view beneath the first condition.

The record count shows 64 records. Only 64 records match the two established filter criterion. The patient must have been ill and be between 20 and 29 years of age. All gadgets added to the Visual Dashboard canvas will only display data from these 64 records. The filter settings appear at the top of the canvas.

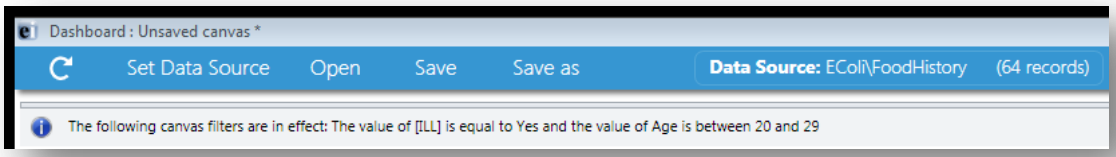


Figure 8.32: Data Filter Setting

Remove Selected Filter

The data filters must be cleared to continue working with the full dataset. Follow the steps below to remove a filter.

1. On the right-hand side of the Visual Dashboard canvas, move the mouse over the **Data Filter** gadget. The gadget expands outwards.
2. Select the **second condition**, which should appear as "**The value of Age is between 20 and 29**."
3. Click the **Remove Selected** button. The condition disappears.
4. Select the only remaining **condition**.
5. Click the **Remove Selected** button. The condition disappears.

Clear All Filters

The **Clear All** button removes all existing filters at once as demonstrated in the example below.

1. On the right-hand side of the Visual Dashboard canvas, move the mouse over the **Data Filter** gadget. The gadget expands outwards.
2. Click the **Clear All** button. All existing filter conditions disappear.

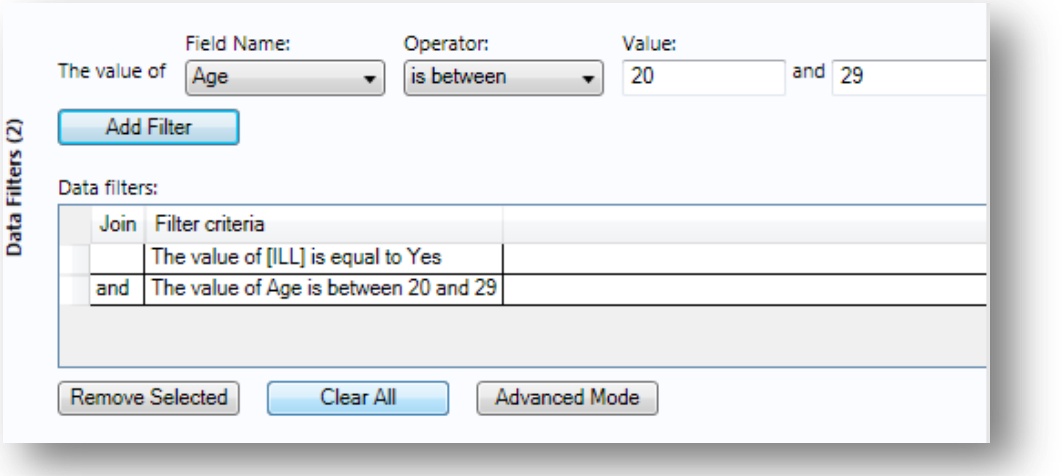


Figure 8.33: Data Filter Gadget/Add Filter with Two Conditions

Advanced Filter Mode

The advanced filter mode allows you to type the desired data filter string into the text box provided. Once the filter is applied, the canvas will only display the records that meet the specified condition(s). The Data Filtering Gadget is located on the right-hand side of the Visual Dashboard canvas. The gadget expands outwards.

Note: Advanced Filtering uses the .NET DataView.RowFilter syntax. For more information about this syntax, refer to Microsoft's website describing the DataView.RowFilter Property.

The example below demonstrates how to use advanced filters. Select **Advanced Mode.** The Advanced Filter Mode appears.

1. In the text box, enter the following condition **"(([ILL] = 1) and (Age >= 20 and Age <= 29)) AND RECSTATUS > 0".**
2. Click the **Apply Filter** button.

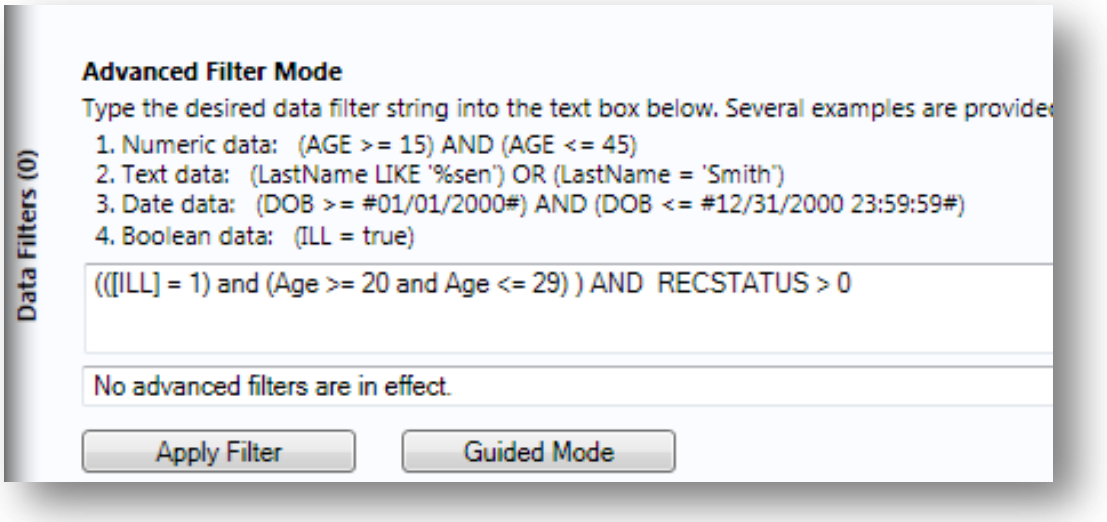


Figure 8.34: Advanced Filter Mode

3. The verbiage "**No advanced filters are in effect**" will be replaced with "**The filter is valid and is now in effect.**" When filters are applied, the conditions appear in green font.
4. The record count in the top-left corner of the Visual Dashboard canvas now reads **64**, indicating that there are 64 out of 359 records where the value of ILL is Yes and the value for age is between 20 and 29.

Note: You can toggle between the Guided Mode and the Advanced Mode by clicking on the respective button on each screen.

Displaying Statistics and Records

Analysis Gadget > Line List

The Line List option creates a list of the current dataset. This allows you to view the details of the data in your current data source. You can select variables to display and then sort or group those variables accordingly. Line List supports adding groups or pages. All fields in a group or on a page will be displayed in such cases. Groups and pages always appear at the bottom of the list.

1. Select the **EColi.PRJ** Data Source. Open the **FoodHistory** form from the **Data Source Explorer** menu.
2. Right click on the canvas and select **Add Analysis Gadget > Line list**.
3. The Line List gadget appears on the Visual Dashboard canvas.

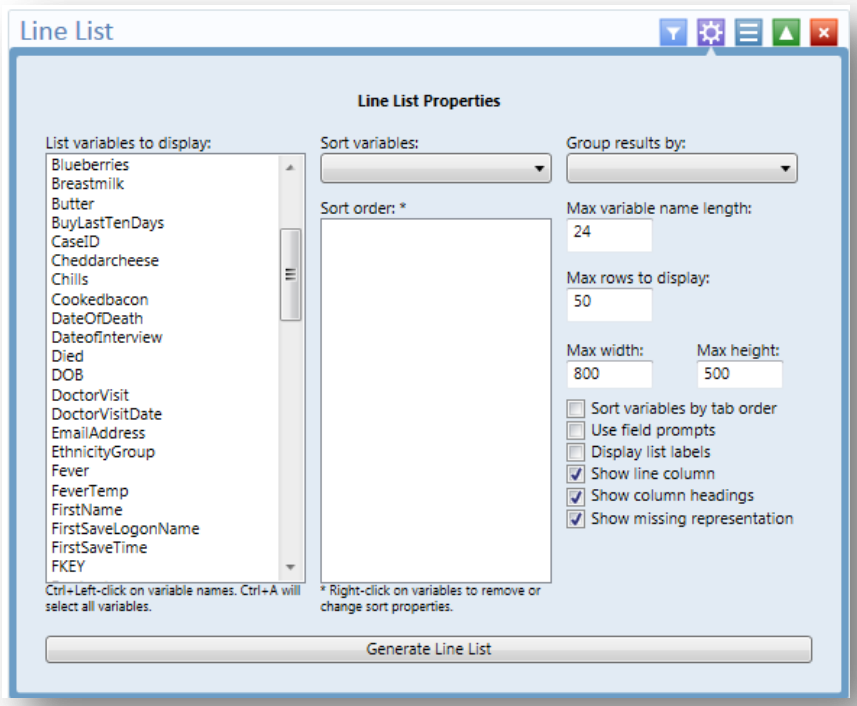


Figure 8.35: Line List Properties

4. To select multiple variables from **List variables to display,** hold down the **Ctrl** key and click on the variables to display. The **Ctrl + A** combination selects all variables at once.
5. Click the **Generate Line List** button. The line list appears on the canvas.

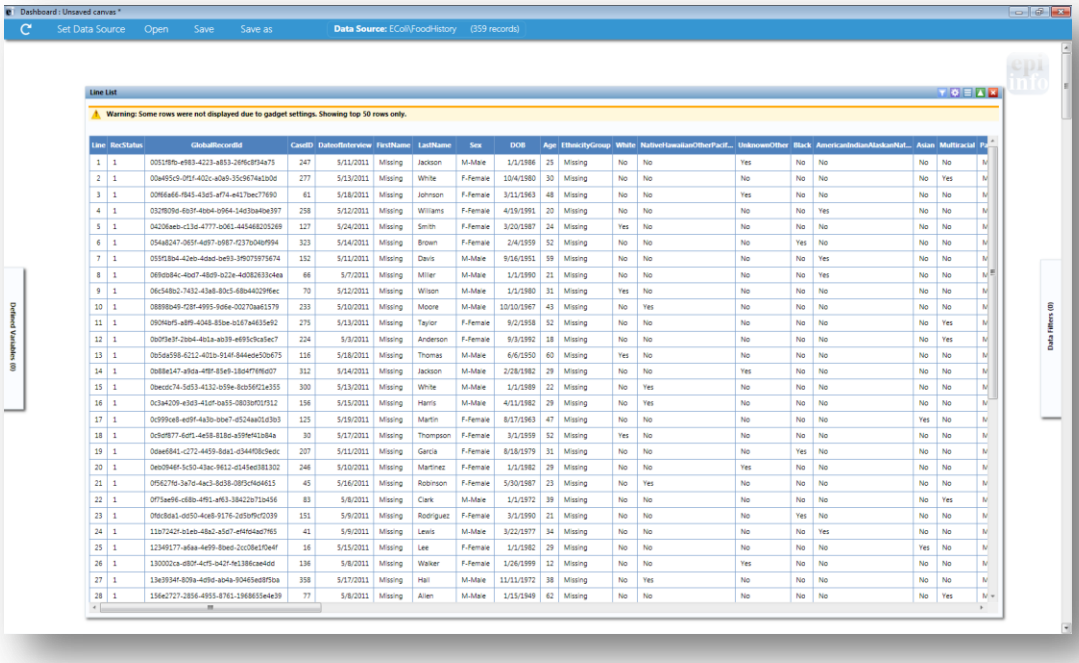


Figure 8.36: Generate Line List

Note: There is a yellow warning at the top of the output. By default, the line list will only show the top 50 rows. The row limit exists to improve performance when working with large datasets. The Max Rows to Display setting can be modified in the Line List Properties panel.

Sorting Records

Sometimes it is important to have the records in a file arranged in a particular order, for example alphabetically by name, or numerically by age. There are two ways to sort the records; by clicking on the column name in the line list or by using the sort options in the line list properties dialog box.

Sorting a List Using by Column Name

Follow the steps below to sort the list by Age.

1. Select the **EColi.PRJ** Data Source. Open the **FoodHistory** form from the **Data Source Explorer** menu.
2. Right click on the canvas and select **Add Analysis Gadget > Line list**.
3. Select all variables from **List Variables to Display** box by pressing **Ctrl + A** on your keyboard.
4. Click **Generate Line List**.
5. The **Line List** gadget appears on the Visual Dashboard canvas.

6. Click on the **Age** column heading**.**
7. The records are displayed by **Age** in ascending order.

Sorting a List Using Line List Properties

1. Select the **EColi.PRJ** Data Source. Open the **FoodHistory** form from the **Data Source Explorer** menu.
2. Right click on the canvas and select **Add Analysis Gadget > Line list**.
3. The **Line List** gadget appears on the Visual Dashboard canvas.
4. Select all variables from **List Variables to Display** box by pressing **Ctrl + A** on your keyboard.
5. The list data is not sorted in any particular order. To sort variables, select the variable from the **Sort variables** drop-down list. The selected variable will appear in the **Sort Order** box.

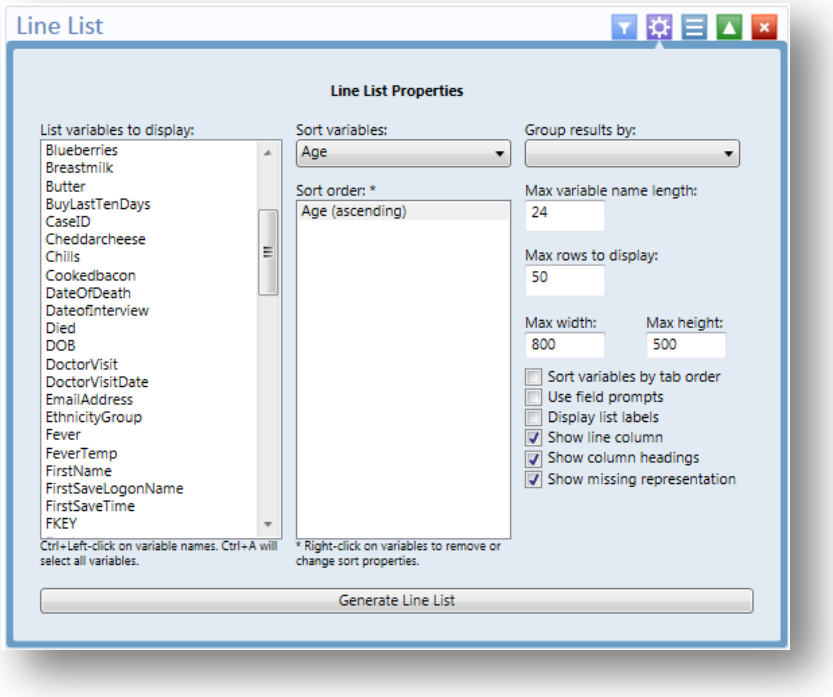


Figure 8.37: Line List/ Sort Order

6. Right click on the variable in the **Sort Order** box to remove the sort variable or to change the sort order from ascending to descending.

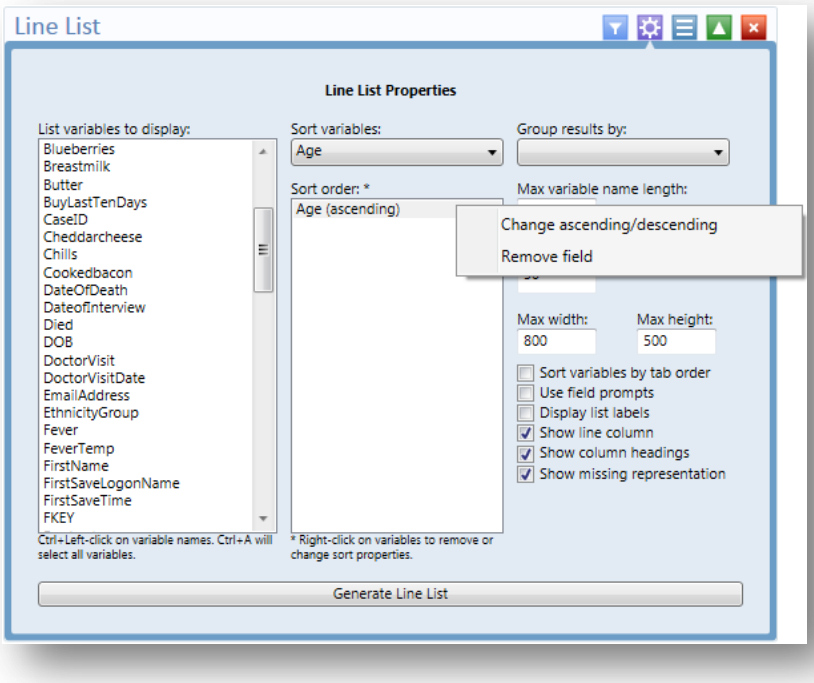


Figure 8.38: Line List/Sort Order options

7. Select a variable from the **Group results by** drop-down list to group the list by a particular field.

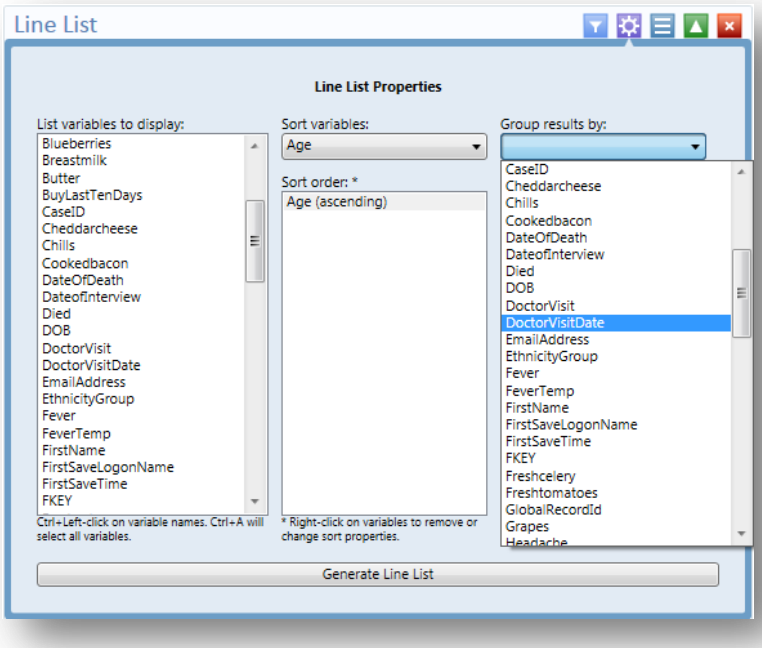


Figure 8.39: Line List/Group results options

8. Click the **Generate Line List** button. A separate line list, grouped by DoctorVisitDate, is generated and displayed. The records in each list are ordered by **Age**.

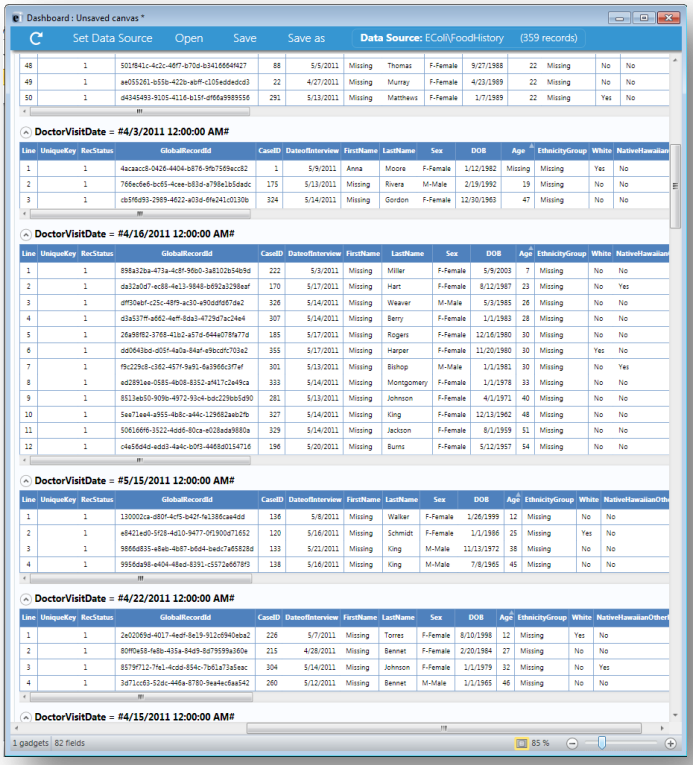


Figure 8.40: Line List with Group results

9. A list may be hidden from view by clicking on the arrow to the left of the list heading.

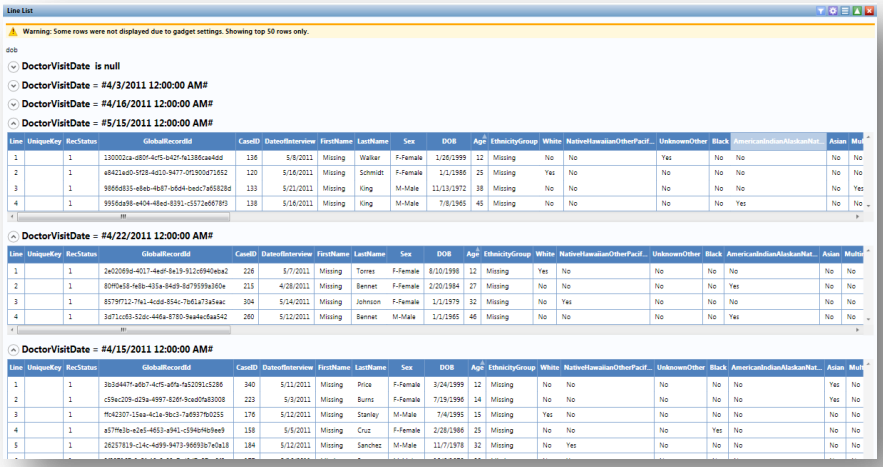


Figure 8.41: Line List Hidden View

Remove Sort Criteria

Remove sort criteria by following the steps below.

1. Right click on the **Line List.**
2. Select **Remove All Sort Criteria.**
3. The Line List will appear with the sort criteria removed.

Other Line List Properties

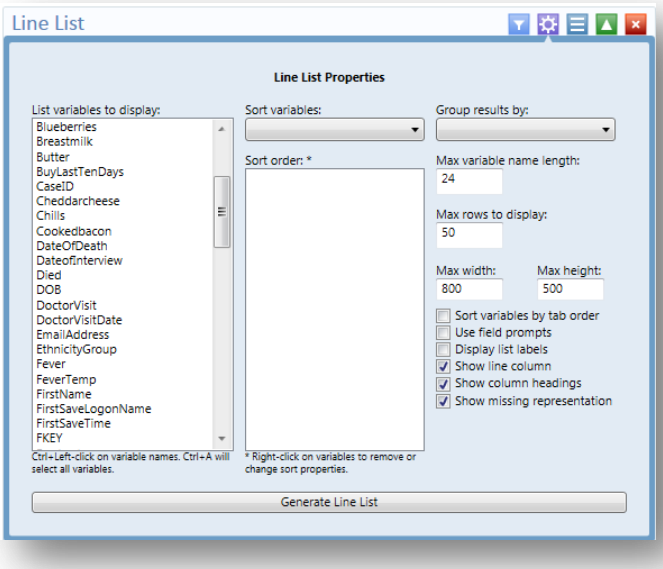


Figure 8.42: Other Line List properties

- The **Max Variable Name Length** text box allows truncating long column names in the list output. It is set to 24 by default.
- The **Max Rows to Display** text box allows changing the maximum number of rows that the line list gadget will display. It is set to 50 by default. A maximum of 2000 rows may be displayed at any given time.
- The **Sort Variables by Tab Order** checkbox forces the columns in the output to be sorted by their tab order.* It is not checked by default.
- The **Use Field Prompts** checkbox will use the field's prompt as the column heading, rather than the field's name.* It is not checked by default.
- The **Display List Labels** checkbox will use the label value for option fields and comment legal fields rather than the underlying value stored in the database.* * Note: These features are available only when the Data Source is an Epi Info 7 project. If the Data Source is not an Epi Info 7 project, such as an Excel spreadsheet, these options have no effect.
- The **Show Line Column** option adds the Line column to the list and displays the line number when the checkbox is selected.
- The **Show Column Headings** option displays the line list column headings when the checkbox is selected.
- The **Show Missing Representation** option displays the word or symbol that represents a missing value for any field that does not have a value. By default, the word "Missing" is used, but other options include "Unknown", "(.)" or another custom setting as specified in the Tools > Options > Analysis tab. If the checkbox is not selected, a field without a value will be left blank.

Exporting a Line List

Once the Line List is created, the following export options are available: Copy List Data to Clipboard, Send List Data to Web Browser, and Send List Data to Excel.

Follow the steps below to Copy List Data to Clipboard.

1. Right click on the **Line List**.
2. Select **Copy List Data to Clipboard.**

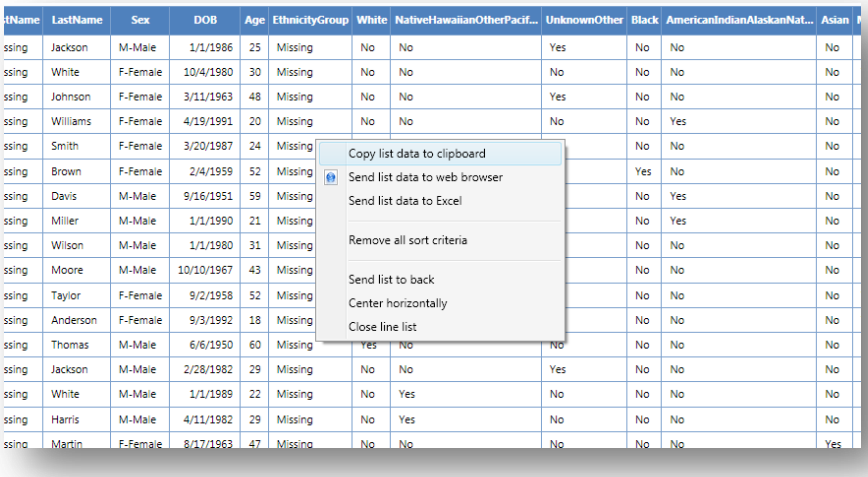


Figure 8.43: Copy List to Clipboard

3. The data is now on the clipboard and may be exported.

Follow the steps below to **Send List Data to Web Browser.**

1. Right click on the **Line List**.
2. Select **Send List Data to Web Browser.**

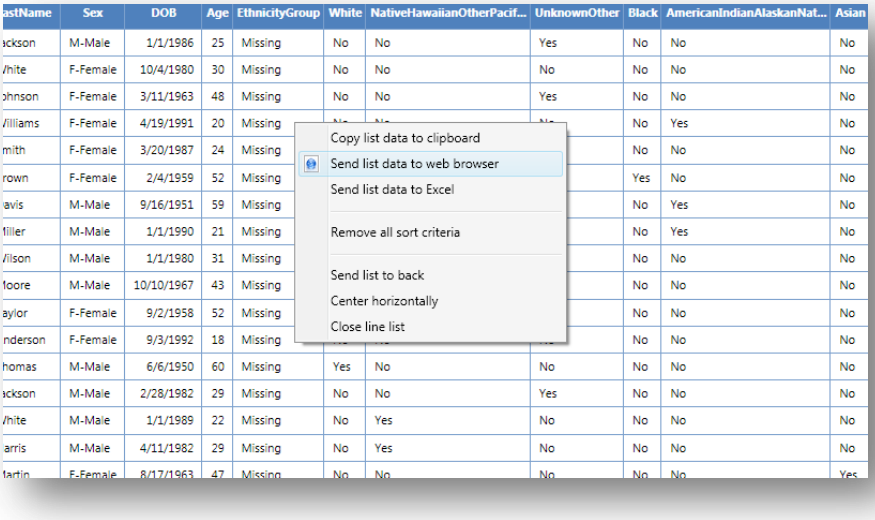


Figure 8.44: Send List Data to Web Browser

3. The data now appears in your web browser.

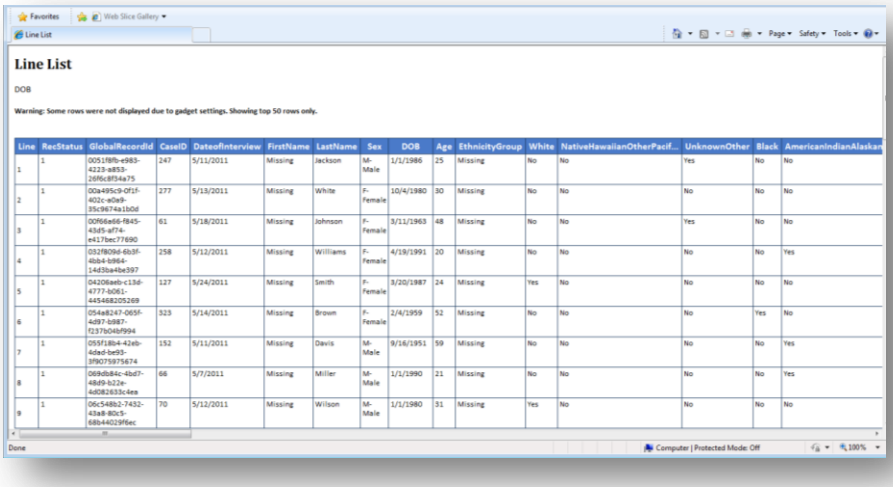


Figure 8.45: List Data in Web Browser

Follow the steps below to **Send List Data to Excel.**

1. Right click on the **Line List**.
2. Select **Send List Data to Excel.**

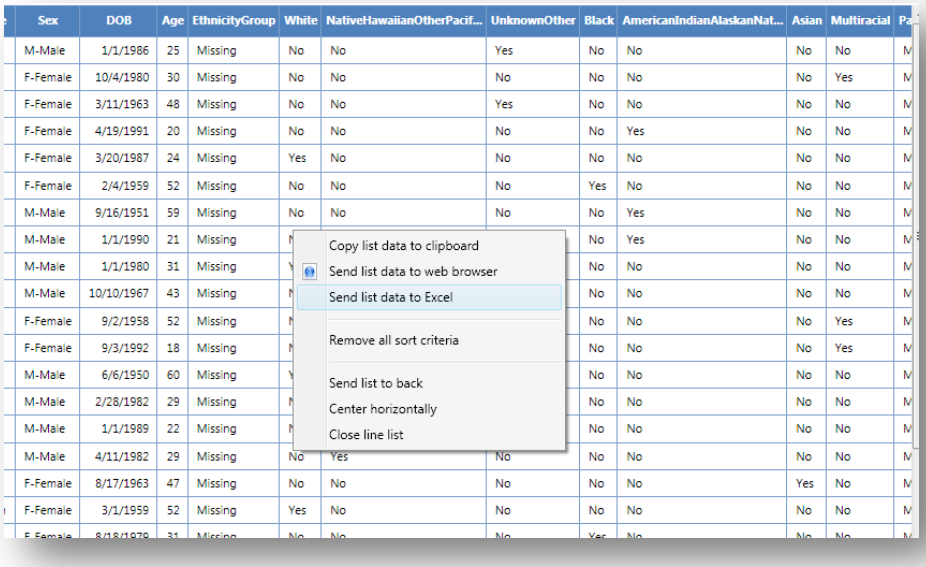


Figure 8.46: Send List Data to Excel

3. The list data appears in a Microsoft Excel spreadsheet.

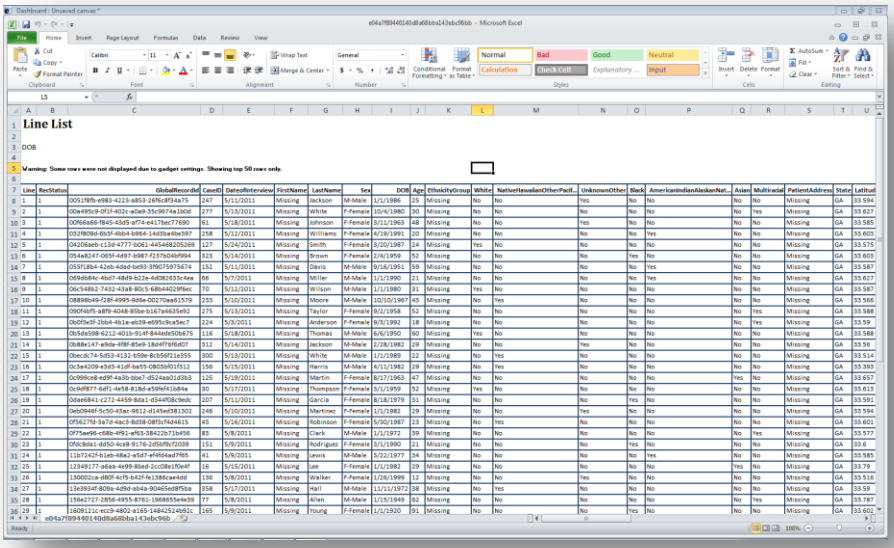


Figure 8.47: List Data in Excel

Note: You must have Microsoft Excel installed to use this feature.

Analysis Gadget > Frequency

The Frequency gadget counts each occurrence in a category for a specified variable and gives the absolute and relative frequencies for each category. This option then produces a frequency table that shows how many records have a value for each variable, the percentage of the total, a cumulative percentage and upper and lower confidence intervals.

1. Select the **EColi.PRJ** Data Source. Open the **FoodHistory** form from the **Data Source Explorer** menu.
2. Right click on the canvas and select **Add Analysis Gadget > Frequency**. The frequency gadget appears on the Visual Dashboard canvas.

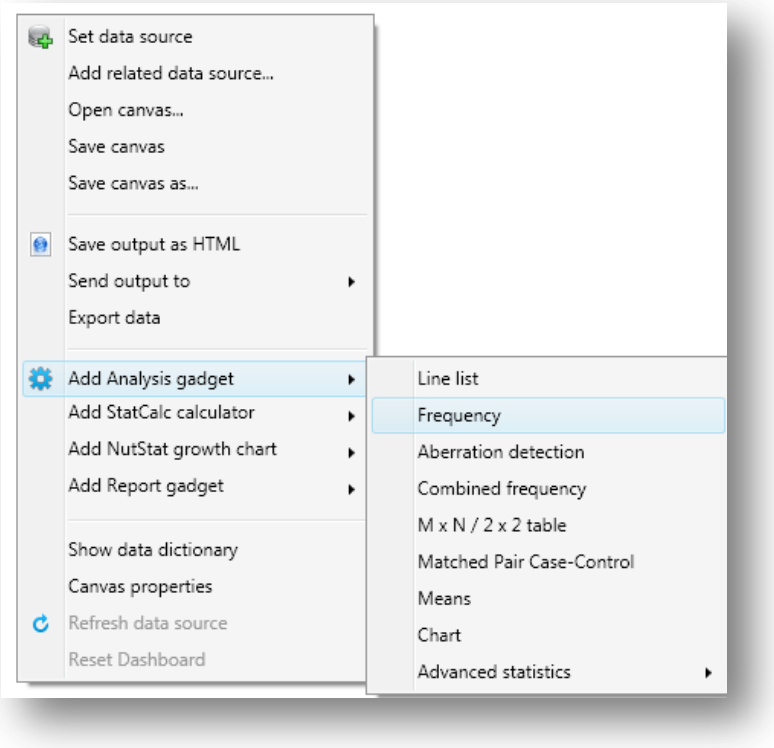


Figure 8.48: Frequency Menu Option

3. From the **Frequency Of** drop-down list, select a **variable** from the data table.

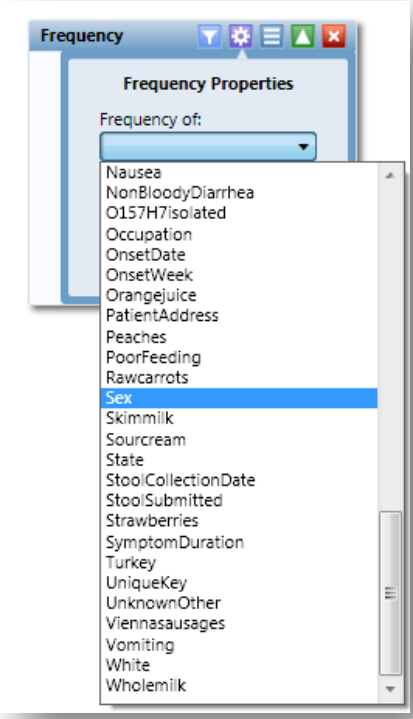
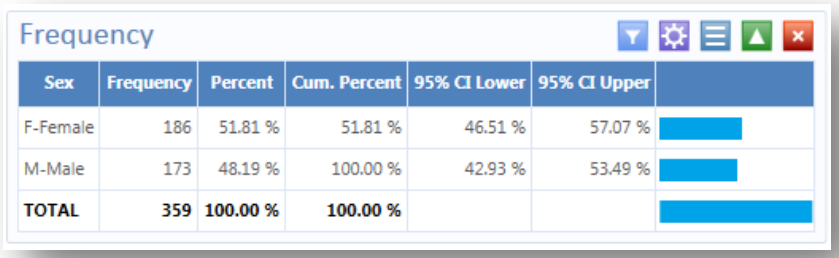


Figure 8.49: Selecting Frequency Of variable

4. Click **Run**. The results appear on the Visual Dashboard canvas.



Sex	Frequency	Percent	Cum. Percent	95% CI Lower	95% CI Upper	
F-Female	186	51.81 %	51.81 %	46.51 %	57.07 %	
M-Male	173	48.19 %	100.00 %	42.93 %	53.49 %	
TOTAL	**359**	**100.00 %**	**100.00 %**			

Figure 8.50: Frequency Results

The **Frequency** column provides the count of individuals that are either female or male. The Percent column indicates the percentage of female or male. The **95% Confidence Limits** are a range of values that indicates the likely location of the true value of a measure, meaning (in this instance) that the percentage of females is likely to be between 46.51% and 57.07%.

Frequency Advanced Options

To use the **Frequency Advanced** options:

1. Select the **EColi.PRJ** Data Source. Open the **FoodHistory** form from the **Data Source Explorer** menu.
2. Right click on the canvas and select **Add Analysis Gadget > Frequency**. The frequency gadget appears on the Visual Dashboard canvas.
3. Click on the **Advanced options** arrow. The **Frequency Properties** dialog box appears.

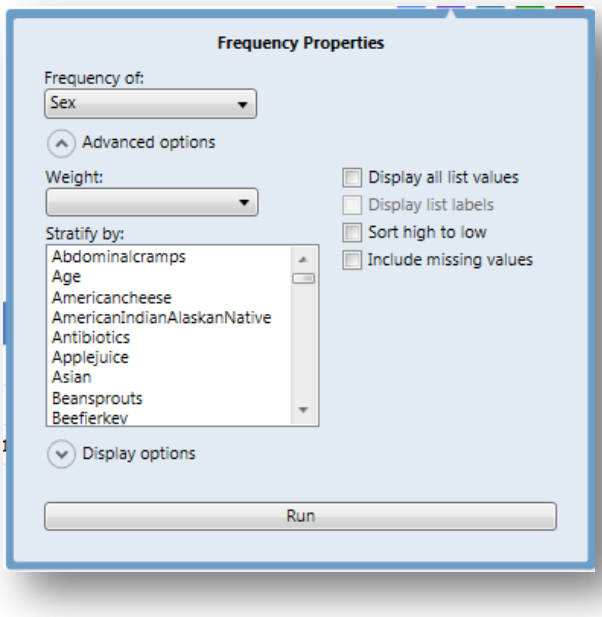


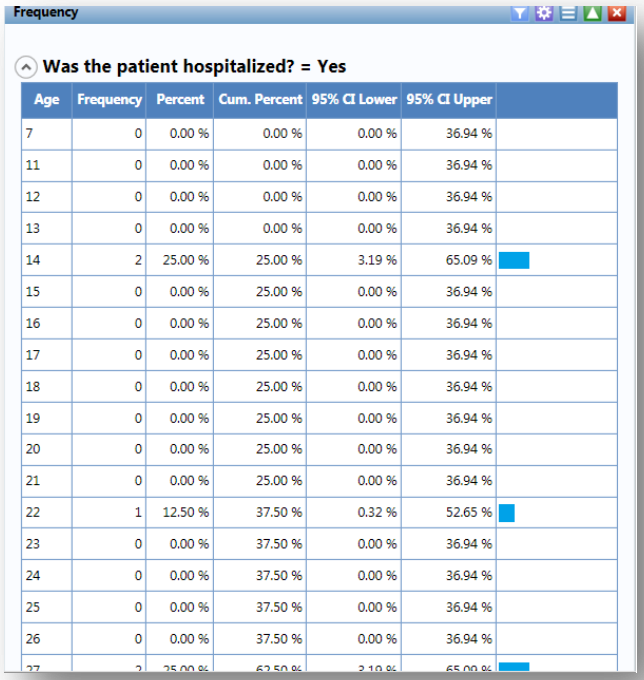
Figure 8.51: Frequency Properties

The following options are available in Frequency Properties:

- **Weight-** The field to use as the weight variable, for example if aggregate data is being analyzed.
- **Stratify By-** The field to use for stratifying the output.
- **Display all list values-** Only applicable when the frequency variable is a drop-down list field in an Epi Info™ 7 project. When selected, the output will show all of the drop-down list values even if they have a count of zero.
- **Display list labels** – Only applicable when the frequency variable is a Comment Legal field or Option Field in an Epi Info™ 7 project. When selected, the output will show the value and the label for Comment Legal fields and the label for Option fields.
- **Sort high to low** – displays the results sorted from high to low based on the selected Frequency of variable
- **Include Missing Values** – This option, which is unchecked by default, displays 'Missing' for any field with missing values.

4. From the **Frequency of** drop-down list, select **Age** from the data table.
5. From the **Weight** drop-down list, select **Died** from the data table.
6. Select **Hospitalized** from the **Stratify by** list.

7. Click **OK**. Results appear on the canvas.

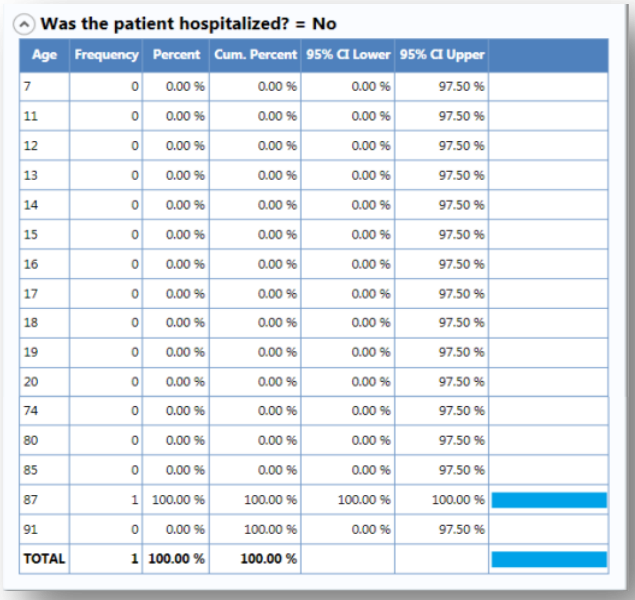


Frequency

Was the patient hospitalized? = Yes

Age	Frequency	Percent	Cum. Percent	95% CI Lower	95% CI Upper	
7	0	0.00 %	0.00 %	0.00 %	36.94 %	
11	0	0.00 %	0.00 %	0.00 %	36.94 %	
12	0	0.00 %	0.00 %	0.00 %	36.94 %	
13	0	0.00 %	0.00 %	0.00 %	36.94 %	
14	2	25.00 %	25.00 %	3.19 %	65.09 %	
15	0	0.00 %	25.00 %	0.00 %	36.94 %	
16	0	0.00 %	25.00 %	0.00 %	36.94 %	
17	0	0.00 %	25.00 %	0.00 %	36.94 %	
18	0	0.00 %	25.00 %	0.00 %	36.94 %	
19	0	0.00 %	25.00 %	0.00 %	36.94 %	
20	0	0.00 %	25.00 %	0.00 %	36.94 %	
21	0	0.00 %	25.00 %	0.00 %	36.94 %	
22	1	12.50 %	37.50 %	0.32 %	52.65 %	
23	0	0.00 %	37.50 %	0.00 %	36.94 %	
24	0	0.00 %	37.50 %	0.00 %	36.94 %	
25	0	0.00 %	37.50 %	0.00 %	36.94 %	
26	0	0.00 %	37.50 %	0.00 %	36.94 %	
27	2	25.00 %	62.50 %	3.19 %	65.09 %	

Figure 8.52: Frequency Line List Stratified View #1



Was the patient hospitalized? = No

Age	Frequency	Percent	Cum. Percent	95% CI Lower	95% CI Upper	
7	0	0.00 %	0.00 %	0.00 %	97.50 %	
11	0	0.00 %	0.00 %	0.00 %	97.50 %	
12	0	0.00 %	0.00 %	0.00 %	97.50 %	
13	0	0.00 %	0.00 %	0.00 %	97.50 %	
14	0	0.00 %	0.00 %	0.00 %	97.50 %	
15	0	0.00 %	0.00 %	0.00 %	97.50 %	
16	0	0.00 %	0.00 %	0.00 %	97.50 %	
17	0	0.00 %	0.00 %	0.00 %	97.50 %	
18	0	0.00 %	0.00 %	0.00 %	97.50 %	
19	0	0.00 %	0.00 %	0.00 %	97.50 %	
20	0	0.00 %	0.00 %	0.00 %	97.50 %	
74	0	0.00 %	0.00 %	0.00 %	97.50 %	
80	0	0.00 %	0.00 %	0.00 %	97.50 %	
85	0	0.00 %	0.00 %	0.00 %	97.50 %	
87	1	100.00 %	100.00 %	100.00 %	100.00 %	
91	0	0.00 %	100.00 %	0.00 %	97.50 %	
TOTAL	**1**	**100.00 %**	**100.00 %**			

Figure 8.53: Frequency Line List Stratified View #2

The results display the frequency of deceased patients by age and are stratified by whether the patient was hospitalized or not. The age, frequency, percent, cumulative percent and upper and lower 95% confidence intervals are displayed. The last column is the percent bar.

You can also click on the Display options arrow and expand the Frequency Properties. The following options are available in Frequency Properties:

- **Use field prompt** – specifies whether to use field prompts and is checked by default
- **Draw borders** – Setting for drawing the frequency's border.
- **Draw header row** – Setting for displaying the frequency's headers.
- **Draw total row** – Setting for displaying the frequency's totals.
- **Decimals to Display** – specifies the number of decimals that will be displayed in the results. The possible values range from zero to four. This is set to two by default.
- **Maximum rows to display** – Specifies number of rows to display.
- **Max width of percent bar** – Width for percent bar column using a % value.

Analysis Gadget > Aberration Detection

The Aberration Detection Analysis gadget can be used with syndromic or national surveillance data. It is designed to monitor changes in the distribution or frequency of health events when compared to historical data. This gadget uses an algorithm implemented by the Early Aberration Reporting System, which is a tool developed by CDC's Division of Bioterrorism Preparedness and Response to assist local-level health offices with early detection of bioterrorism events or possible outbreaks.

1. Select the **Ears.xls** Data Source from the Sample project folder. Click on **Sheet 1$**.
2. Right click on the canvas and select **Add Analysis Gadget > Aberration Detection**. The **Aberration Detection Properties** dialog box appears.

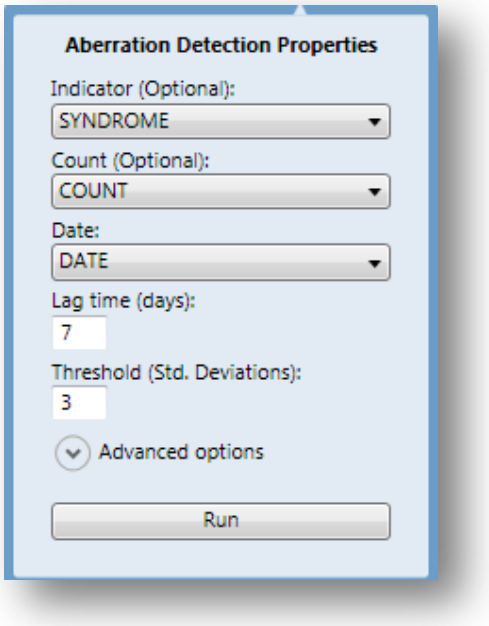


Figure 8.54: Aberration Detection Properties

3. Select **Syndrome** from the **Indicator** drop-down list.
4. Select **Count** from the **Count (Optional)** drop-down list.
5. Select **Date** from the **Date** drop-down list.
6. Enter **7** for **Lag Time (days)**.
7. Enter **3** for **Threshold (Std. Deviations)**.
8. Click the **Run** button. The Aberration Detection line graph displays on the canvas.

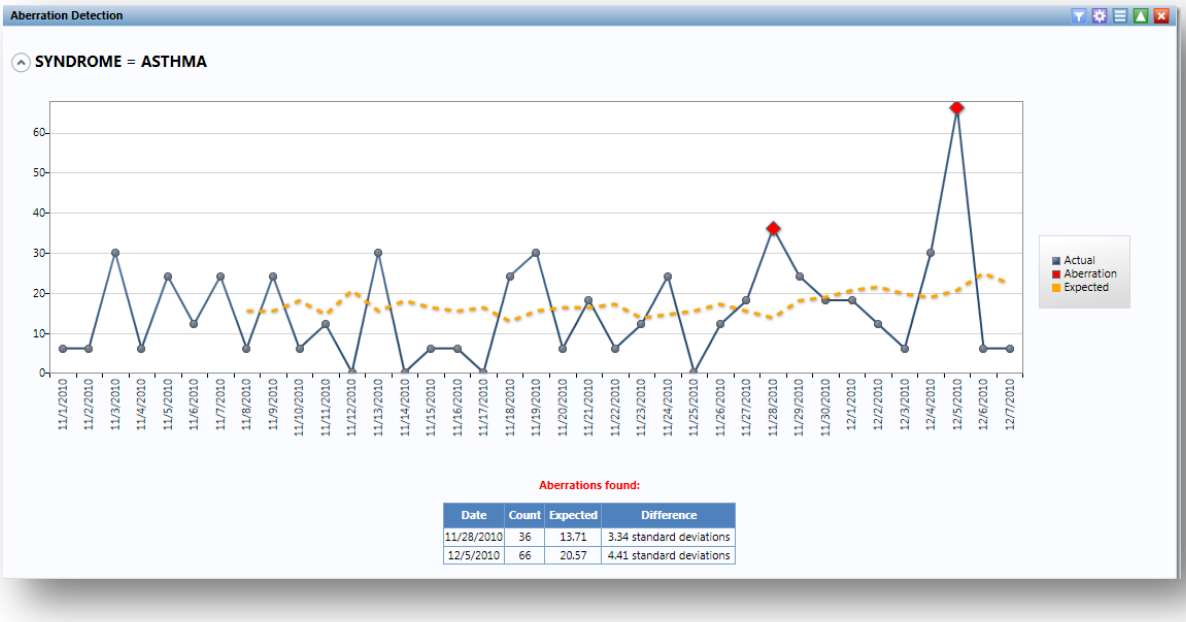


Figure 8.55: Aberration Detection Line Graph

The result displays the aberrations found, date, count, expected count, and the standard deviations. The current number of patient visits with Asthma is higher (Count: 36, 66) than the defined threshold (Expected; 13.71, 20.57), hence the aberrations detected on 11/28/2010 and 12/05/2010. These aberrations may need to be evaluated by an epidemiologist (or other public health professional) to determine whether it signifies an event of public health importance warranting further investigation.

Analysis Gadget > Combined Frequency

The Combined Frequency option produces a table that illustrates the frequency and percentage of grouped variables.

1. Select the **EColi.PRJ** Data Source. Open the **FoodHistory** form from the **Data Source Explorer** menu.
2. Right click on the canvas and select **Add Analysis Gadget > Combined Frequency**. The combined frequency gadget appears on the Visual Dashboard canvas.

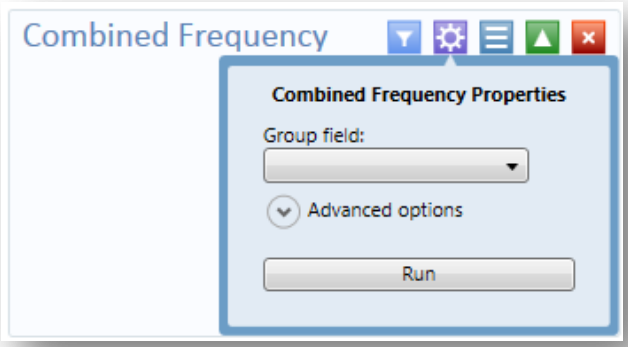


Figure 8.56: Combined Frequency Properties

3. From the **Group field** drop-down list, select a **DemographicInformation**.
4. Click **Run.** The results appear on the Visual Dashboard canvas.

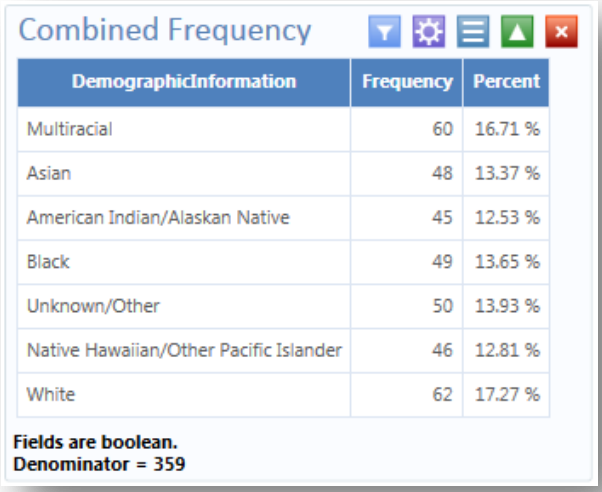


Figure 8.57: Combined Frequency Results

Combined Frequency Advanced Options

To use the Combined Frequency Advanced options:

1. Select the **EColi.PRJ** Data Source. Open the **FoodHistory** form from the **Data Source Explorer** menu.
2. Right click on the canvas and select **Add Analysis Gadget > Combined Frequency**. The combined frequency gadget appears on the Visual Dashboard canvas.
3. Click on the arrow to display **Advanced Options.**

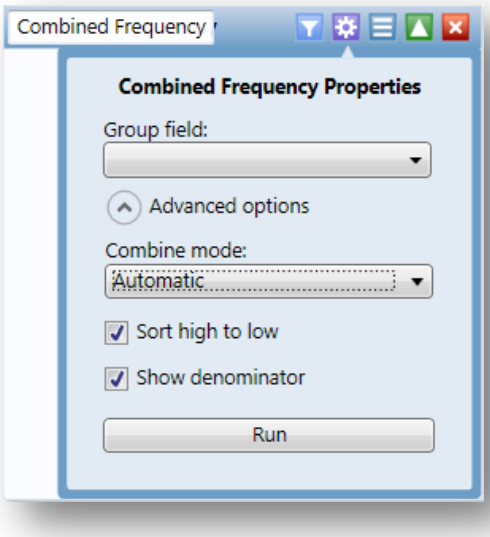
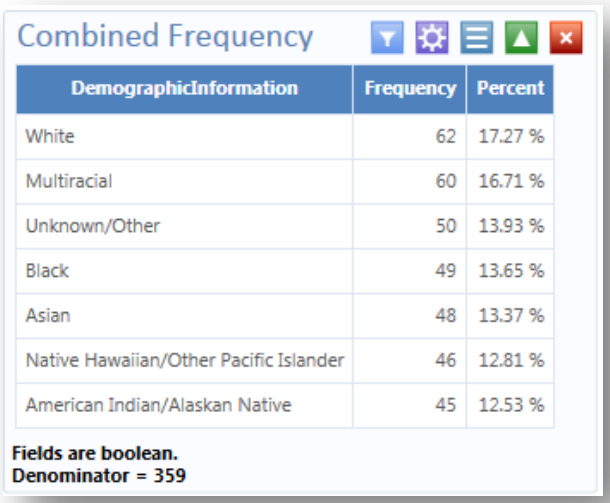


Figure 8.58: Combined Frequency Properties Combine Mode

4. From the **Group Field** drop-down list, select **DemographicInformation**.
5. Select **Automatic** from the **Combine Mode** drop-down list.

    - Automatic- will automatically determine the appropriate combination mode of either Boolean or Categorical.
    - Boolean- use this mode for Yes/No and Checkbox fields or if you wish for the fields in the group to be treated as such.
    - Categorical- use this mode if your data is grouped according to similar characteristics in a way that shows the relative frequencies of each group or category.
    - Value to treat as true – This field appears when the Combine Mode is Boolean. The specified value will be treated as the true or positive value and all other values will be treated as false or negative values.
6. Mark your selection for **Sort High to Low.** This option will display the results sorted from highest group field frequency to the lowest. The **Sort High to Low** checkbox is checked by default.
7. Mark your selection for **Show Denominator**. This option will display the total number of records in the results. The **Show Denominator** checkbox is checked by default.
8. Click **Run**. The Combined Frequency results appear on the Visual Dashboard canvas.



Combined Frequency

DemographicInformation	Frequency	Percent
White	62	17.27 %
Multiracial	60	16.71 %
Unknown/Other	50	13.93 %
Black	49	13.65 %
Asian	48	13.37 %
Native Hawaiian/Other Pacific Islander	46	12.81 %
American Indian/Alaskan Native	45	12.53 %

Fields are boolean.
Denominator = 359

Figure 8.59: Combined Frequency Results

The result displays the frequency and percentage of each demographic category.

Analysis Gadget > M x N/ 2 x 2 Table

In epidemiology, 2 x 2 tables are frequently used to examine the relationship between two or more categorical values. In these tables, usually an exposure variable is considered the risk factor. The outcome variable is considered the disease of consequence (e.g., the person had the disease or outcome of interest or they did not). Values of the first variable will appear on the left margin of the table, and those of the second will be across the top of the table. Normally, cells contain counts of records matching the values in corresponding marginal labels. The M x N /2 x 2 Table analysis gadget in Visual Dashboard is demonstrated below:

1. Select the **Sample.PRJ** Data Source. Open the **Oswego** form from the **Data Source Explorer** menu. Click **OK**.
2. Right click on the canvas and select **Add Analysis Gadget > M x N /2 x 2 table**. The **Crosstabulation Properties** dialog box appears on the Visual Dashboard canvas.
3. From the **Exposure** drop-down list, select **Vanilla.**
4. From the **Outcome** drop-down list, select **ILL**.

Advanced Options allow you to; add a weight variable, select **Stratify by** variable and alter display settings. Advanced Options are not used in this example.

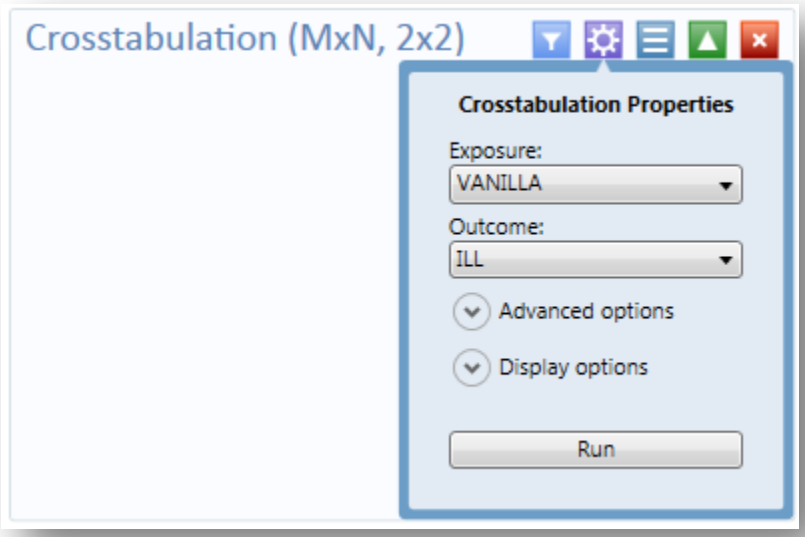


Figure 8.60: Crosstabulation Properties

5. Click **Run**. Results appear on the Visual Dashboard canvas.

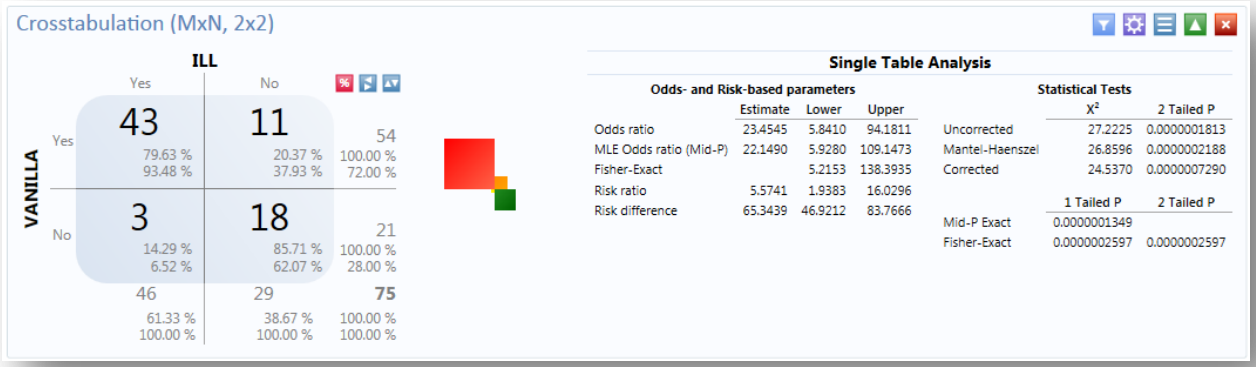


Figure 8.61: Crosstabulation Results

The results display a 2 x 2 table and a single table analysis of all records cross-tabulated by exposure to vanilla where the outcome was ill. Out of the 75 records in this dataset, 43 patients were exposed to vanilla and became ill. Eleven patients were exposed to vanilla and did not become ill. Of the 21 patients that were not exposed to vanilla, only three became ill.

The Single Table Analysis chart on the right displays Odds Ratios, Risk Ratios, and Statistical Tests results for this example.

Analysis Gadget > Matched Pair-Case Control

The Matched Pair Case Control option in Visual Dashboard is for use with pair-matched case-control studies. Each case must have exactly one matched control. For this reason, it is generally incorrect to perform the analysis using 2x2 tables since it does not take matching into consideration. To use this option, you need to specify an Exposure Variable, the Outcome Variable (i.e., case vs. control), and a Match variable that links each case to its control. The following example demonstrates a matched pair-case control analysis.

The dataset below is from a matched case-control study of the consumption of chicken where the outcome resulted in the patient becoming ill. The primary exposure was the consumption of chicken (AnyChkn), the case control is **CaCO**, and the **Pair Group ID** is **Matched pairs**.

1. Select the **Case Control DatabaseExample.xlsx** Data Source.
2. Select **Section_1_3 & 8** form in the **Data Source Explorer** menu**.**
3. Click Ok.
4. Select **Add Analysis Gadget > Matched Pair-Case Control**.
5. The **Matched Pair Case Control Properties** dialog box appears.
6. From the **Exposure** drop-down list, select **AnyChkn_RECODED**.
7. From the **Case/Control** drop-down list, select **CaCo**.
8. From the **Pair Group ID** drop-down list, select **Matched pairs.**
9. Click on **Define Value Mappings**
10. Click on **1**
11. Click on the **>** button on the **Yes values:** section
12. Click on **0**
13. Click on the **>** button on the **No values:** section
14. Click **Ok**.
15. Click **Run**

The **Matched Pair Case-Control** results appear on the canvas.

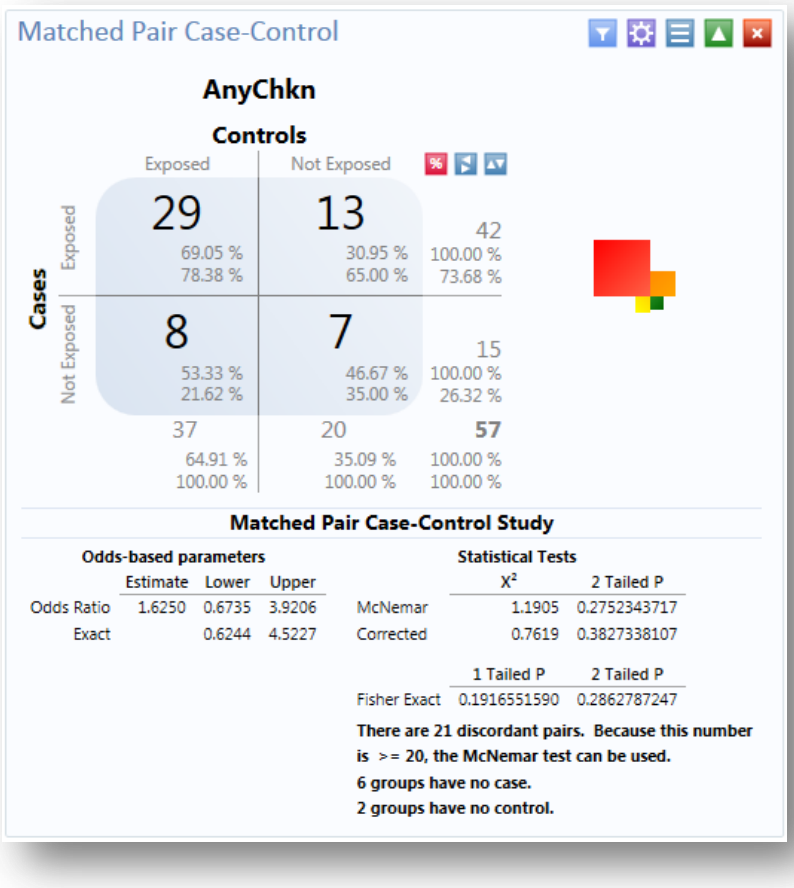


Figure 8.62: Matched Pair Case-Control results

The results display that out of 57 matched pairs, 29 had both the case and the control exposed to AnyChkn, 13 had the case but not the control exposed, eight pairs had the control exposed but the case unexposed, and seven had neither the case nor the control exposed.

The Odds-Ratio is greater than 1, which suggests that eating chicken may be more likely to result in being ill. However, the confidence intervals contain 1 and the P values are less than 0.05, which indicate that there is no significant association between eating chicken and becoming ill.

Analysis Gadget > Means

The Means gadget calculates the average for a continuous numeric variable. A **Yes/No** field returns numeric values (Yes=1, No=0) which allows the **Means** gadget to calculate the proportion of respondents answering yes. For this situation, **Analysis Gadget > Frequency**, has two formats:

- If only one variable is selected, the program produces a table similar to one produced by the Frequency option with descriptive statistics.
- If two variables are selected, the first variable contains the data to be analyzed. The second indicates how groups will be distinguished. The output of this format is a table similar to one produced by the M x N/ 2 x 2 table with descriptive statistics.

1. Select the **Sample.PRJ** Data Source. Open the **Oswego** form from the **Data Source Explorer** menu.
2. Click **OK**.
3. Right click on the canvas and select **Add Analysis Gadget > Means**. The **Means Properties** dialog box appears on the Visual Dashboard canvas.

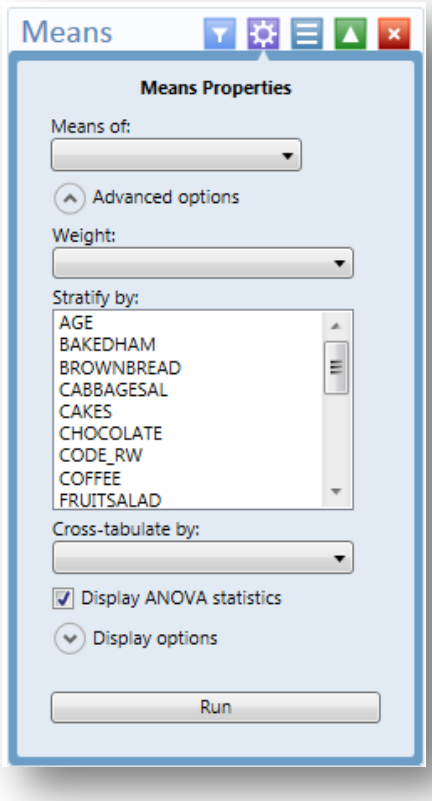
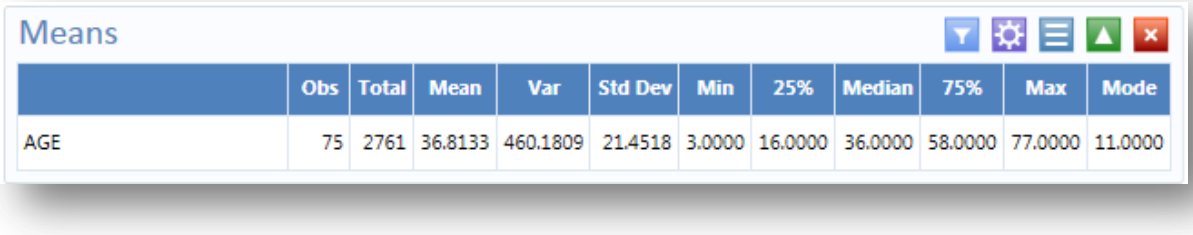


Figure 8.63: Means Properties

5. From the **Means Of** drop-down list, select **Age**.
6. Click the arrow to display **Advanced Options.**
   - The **Cross-tabulate by** value of drop-down list contains a variable to help determine if the means of a group are equal.
   - The **Stratify by** drop-down list contains a variable to act as a grouping variable.
   - The **Weight** drop-down list contains a variable for weighted analysis.
   - The **Output columns to display** option specifies the columns to include in this analysis.
   - The **Decimals to Display** specifies the number of decimals that will be displayed in the results. The possible values range from zero to four. This is set to two by default.
   - The **Display ANOVA statistics** checkbox specifies whether to display the analysis of variance statistics. This option is selected by default. If with large data sets, the ANOVA statistics are not required, performance may be improved by turning off (un-checking) this feature.

6. Click **Run**. The results are displayed on the canvas.



Means

	Obs	Total	Mean	Var	Std Dev	Min	25%	Median	75%	Max	Mode
AGE	75	2761	36.8133	460.1809	21.4518	3.0000	16.0000	36.0000	58.0000	77.0000	11.0000

Figure 8.64: Means Table

The Mean age of individuals in the dataset is 36.8.

Analysis Gadget > Chart

Visual Dashboard produces histograms, scatter plots, pie charts, bar and line graphs directly from data files. This option produces charts based on the types of data available in the project. The following are the graph types capable of being generated by the Chart option:

- **Epi Curve** charts use vertical bars to represent the count or weight for each value of the main variable. Each series creates an additional vertical bar at each point. The main variable must be either numeric or date/time. This graph differs from the bar graph because adjacent bars represent equal ranges of the main variable.
- **Scatter** charts display variables along an X-Y axis as a scatter plot. The X variable is the independent variable and Y variable is the dependent variable. Each series is represented by a different point style.

- **Stacked Column** is similar to a bar chart but represents the counts or weights of two variables.
- **Bar** charts use horizontal bars to represent the count or weight of each value of the main variable(s). Each series creates an additional horizontal bar at each point.
- **Column** charts use vertical bars to represent the count or weight for each value of the main variable(s). Each series results in an additional vertical bar at each point; the bars are distinguished by their style.
- **Line** charts connect X and Y data points with straight lines. Each series is represented by a different style of line and both variables must be numeric.
- **Pie** charts use a circle to represent each series and each value of the main variable has a slice of the circle proportional to the value associated with it.
- **Pareto** charts use vertical bars to represent the count or weight for each value of the main variable(s) and a dashed line to represent the accumulated percentage. Each series results in an additional vertical bar at each point; the bars are distinguished by their style.

The examples below demonstrate how to create a column chart, a pie chart, an Epi Curve chart, and a Pareto chart.

Generate a Column Chart

Follow the steps below to create a bar graph using data from the Sample.PRJ project.

1. Open the **Sample.PRJ** project and select the **Oswego** form.
2. Right click on the canvas and select **Add Analysis Gadget > Charts>Column chart**. The **Chart Properties** dialog box appears on the Visual Dashboard canvas.
3. From the **Main variable** drop-down list, select the variable **Age** to use for the independent variable.
4. Leave the **Weight**, **Stratify By**, **Chart size**, and **Show grid Lines** options at the default settings.
5. Click **Run**. The graph appears on the canvas displaying the number of patients by age.

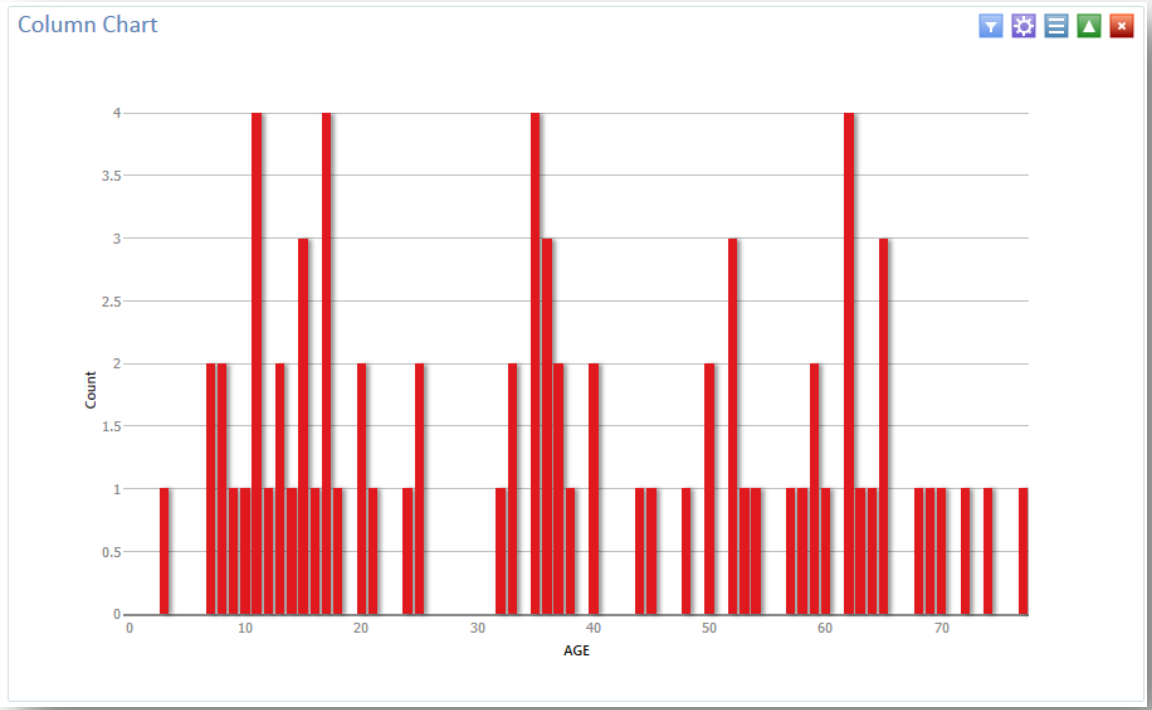


Figure 8.65: Column Chart

Generate a Pie Chart

Follow the steps below to create a pie chart showing age categories of church supper attendees.

1. Open the **Sample.PRJ** project and select the **Oswego** form. Recode the **Age** variable using the **Defined Variables** gadget.

    - On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
    - Click the **New Variable** button.
    - Select **With Recoded Value**. The **Add Recoded Variable** dialog box appears.
    - From the **Source** field drop-down list, select **Age**.
    - Click the **Fill Ranges** button. The **Fill Ranges** dialog box appears.
    - Enter **0** for **Start value**, **70** for **End value**, and **10** for **By**.
    - Click **OK**. The **Add Recoded Variable** window appears with the **From, To**, and **Representation** columns populated.
    - Click **OK**. The variables are recoded.

2. Right click on the canvas and select **Add Analysis Gadget > Charts>Pie chart**. The **Chart Properties** dialog box appears on the Visual Dashboard canvas.
3. From the **Main variable** drop-down list, select the variable **AGE_RECODED**.
4. Leave the **Weight**, **Chart Size**, **Show grid lines** options at the default settings.
5. Click **Run**. The graph appears on the canvas.

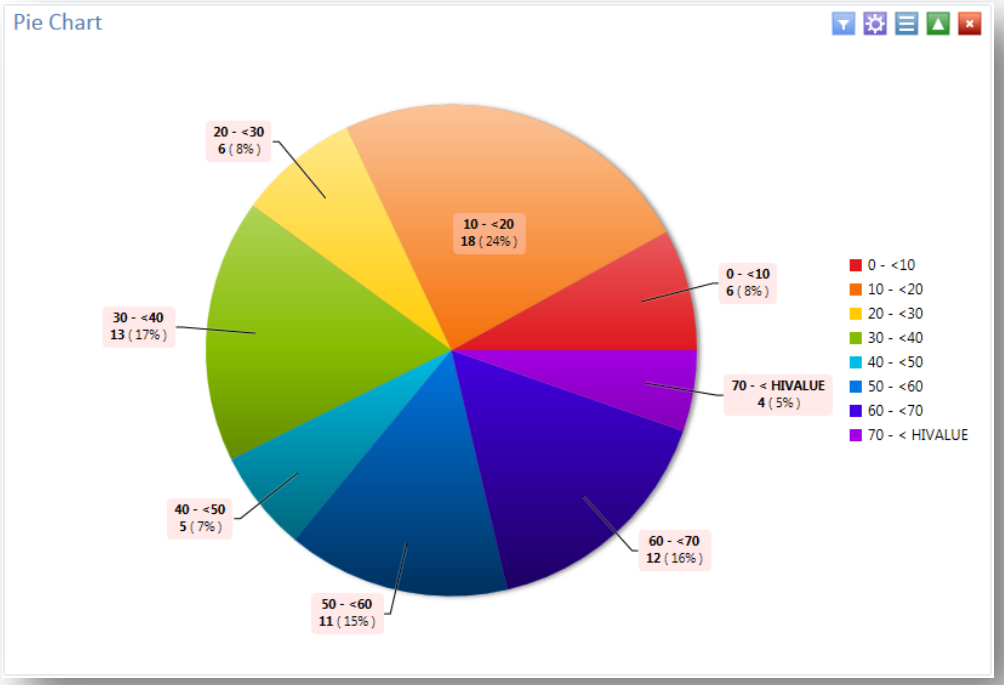


Figure 8.66: Pie Chart

The chart shows the age categories of church supper attendees by age group.

Generate an Epi Curve

Follow the steps below to create an Epi Curve showing the incubation time for an unknown pathogen.

1. Open the **Ecoli.PRJ** project and select the **FoodHistory** form.
2. Right click on the canvas and select **Add Analysis Gadget > Chart>Epi curve chart**. The **Chart Properties** dialog box appears on the Visual Dashboard canvas.
3. From the **Main variable** drop-down list, select **OnsetDate**.
4. Click on the Configuration panel icon.
5. Click the arrow to expand the **Display options**.
6. Update the **X-axis angle:** setting to -90. The date values should now be displayed on the x-axis. If your computer screen is too small, you might need to change the width setting of the chart to a higher number until the values are displayed.

7. Change the width setting to **1000**
8. Click on the **Show Legend** box
9. Click on the arrow to expand the **Advanced options**.
10. Click on the **Sex** variable in the **Stratify by:** section.
11. Click on the **Run** button. The Epi Curve chart appears on the canvas.

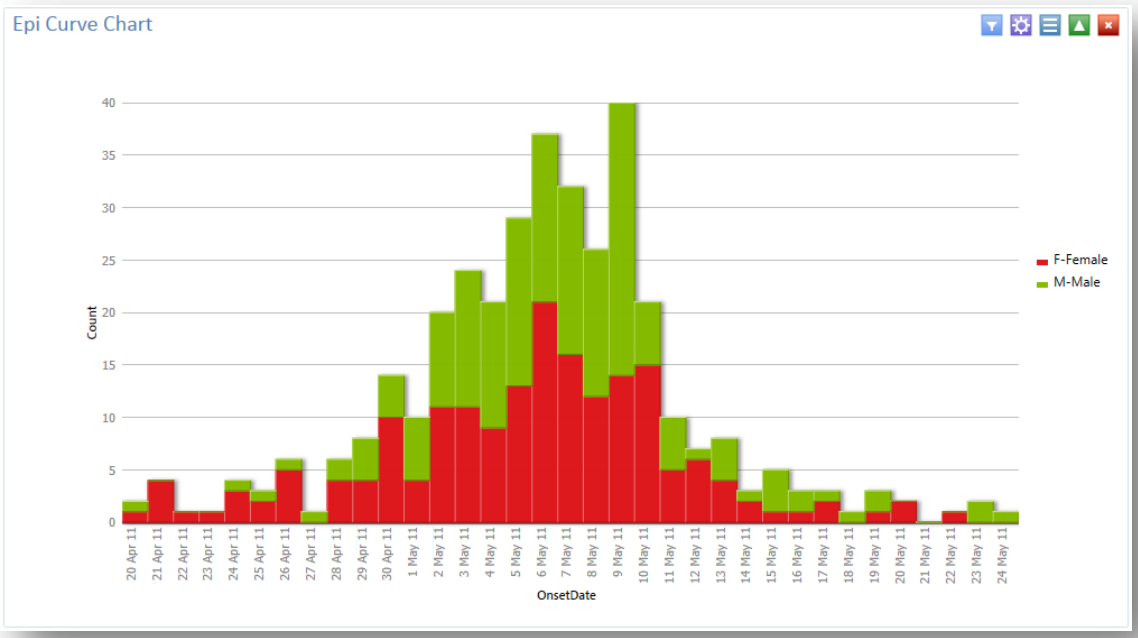


Figure 8.67: Epi Curve Chart

Generate a Pareto Chart

Follow the steps below to create an Epi Curve showing the incubation time for an unknown pathogen.

1. Open the **Ecoli.PRJ** project and select the **FoodHistory** form.
2. Recode the Age variable using the **Defined Variables** gadget.

   - On the left-hand side of the Visual Dashboard canvas, move the mouse cursor over the **Defined Variables** gadget. The gadget expands and becomes fully visible.
   - Click the **New Variable** button.
   - Select **With Recoded Value**. The **Add Recoded Variable** dialog box appears.
   - From the **Source** field drop-down list, select **Age**.
   - Click the **Fill Ranges** button. The **Fill Ranges** dialog box appears.
   - Enter **0** for **Start value**, **70** for **End value**, and **2** for **By**.

- Click **OK**. The **Add Recoded Variable** window appears with the **From**, **To**, and **Representation** columns populated.
- Click **OK**.

3. Right click on the canvas and select **Add Analysis Gadget > Charts>Pareto chart**. The **Chart Properties** dialog box appears on the Visual Dashboard canvas.
4. From the **Chart Type** drop-down list, select **Pareto**.
5. From the **Main variable** drop-down list, select the **Age_Recoded**.
6. Click on the **Run** button. The Pareto chart appears on the canvas.

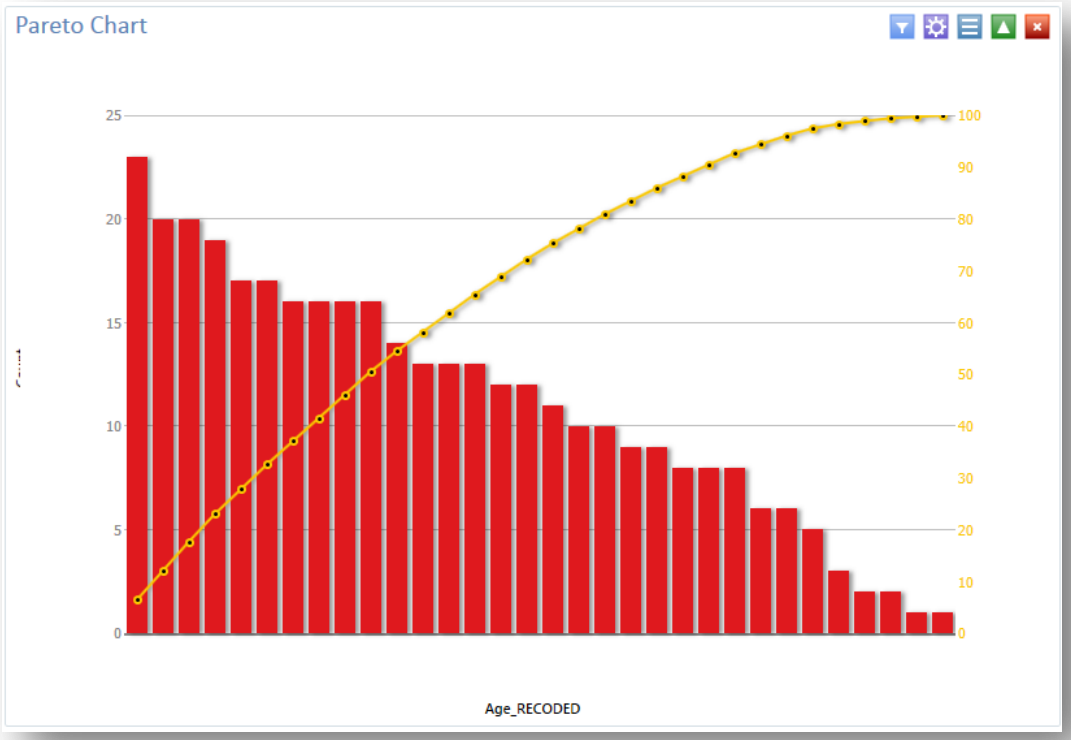


Figure 8.68: Pareto Chart

Using Advanced Statistics

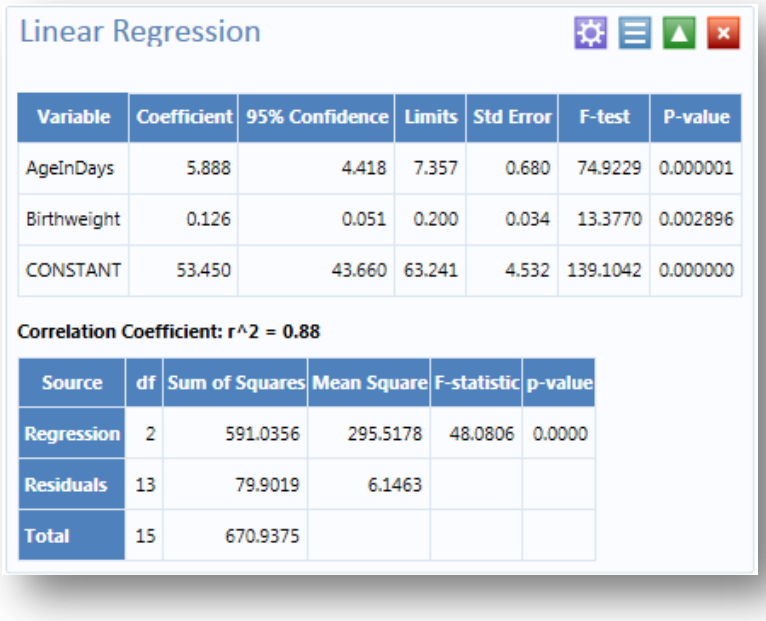
Linear Regression

Linear regression is an analysis tool that identifies a relationship between a continuous variable and one or more independent variables. It can be used for simple linear regression (only one independent variable), for multiple linear regression (more than one independent variable), and for quantifying the relationship between two continuous variables

(correlation). Linear regression is used when you want to determine the relationship between one dependent variable with one or more independent variables.

In the example below, linear regression is used to determine if systolic blood pressure can be predicted by an infant's birth weight and age. The dependent variable is systolic blood pressure, and the independent variables are birth weight in ounces and age in days.

1. Select the **Sample.prj** project. Open the **BabyBloodPressure** form from the **Data Source Explorer** menu.
2. Click **OK.**
3. Right click on the canvas and select **Add Analysis Gadget > Advanced Statistics > Linear Regression**. The **Regression Properties** dialog box appears on the Visual Dashboard canvas.
4. From the **Outcome** Variable drop-down list, select **SystolicBlood**.
5. From the **Fields** drop-down list, select **AgeInDays** and **Birthweight**.
6. Click **Run.** Results appear in the Visual Dashboard canvas.



Variable	Coefficient	95% Confidence	Limits	Std Error	F-test	P-value
AgeInDays	5.888	4.418	7.357	0.680	74.9229	0.000001
Birthweight	0.126	0.051	0.200	0.034	13.3770	0.002896
CONSTANT	53.450	43.660	63.241	4.532	139.1042	0.000000

Correlation Coefficient: r^2 = 0.88

Source	df	Sum of Squares	Mean Square	F-statistic	p-value
Regression	2	591.0356	295.5178	48.0806	0.0000
Residuals	13	79.9019	6.1463		
Total	15	670.9375			

Figure 8.69: Linear Regression Results

Both independent variables' coefficients are positive and the F-statistic associated with each independent variable is highly significant (p-value < 0.01), suggesting that each variable is a predictor of higher systolic blood pressure.

Linear Regression Properties

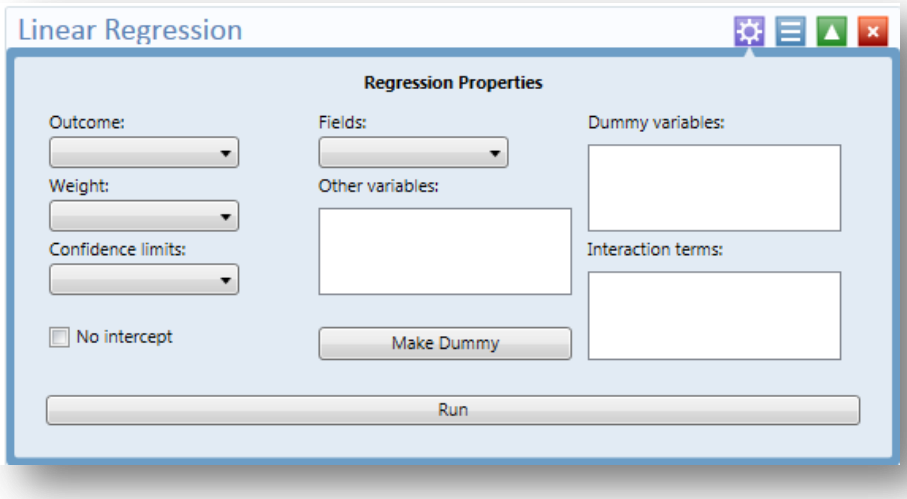


Figure 8.70: Linear Regression Properties

- The **Outcome** is the dependent variable for the regression. The outcome variable must be numeric or a Yes/No field.
- A **Weight** variable may be selected to use in weighted analyses.
- The **Confidence Limits** specifies the probability level at which confidence limits are computed.
- If **No Intercept** is selected, the regression is performed without a constant term, forcing the regression line through the origin.
- The **Fields** drop-down list contains the predictor (independent) variables.
- When selected, the predictor variables will appear in the **Other variables** list box. Double click on a variable to remove it from the **Other variables** list box.
- Select a variable from the **Other Variables** list box to activate the **Make Dummy** button. The selected variable will then appear in the **Dummy Variable** list box.
- **Interaction Terms** are defined with the **Make Interaction** button. Make Interaction appears if two or more variables are selected from the **Other Variables** list box. If you click **Make Interaction**, the relationship populates the **Interaction Terms** list box. Make Interaction adds all possible combinations of the selected variables to the regression as interaction terms.

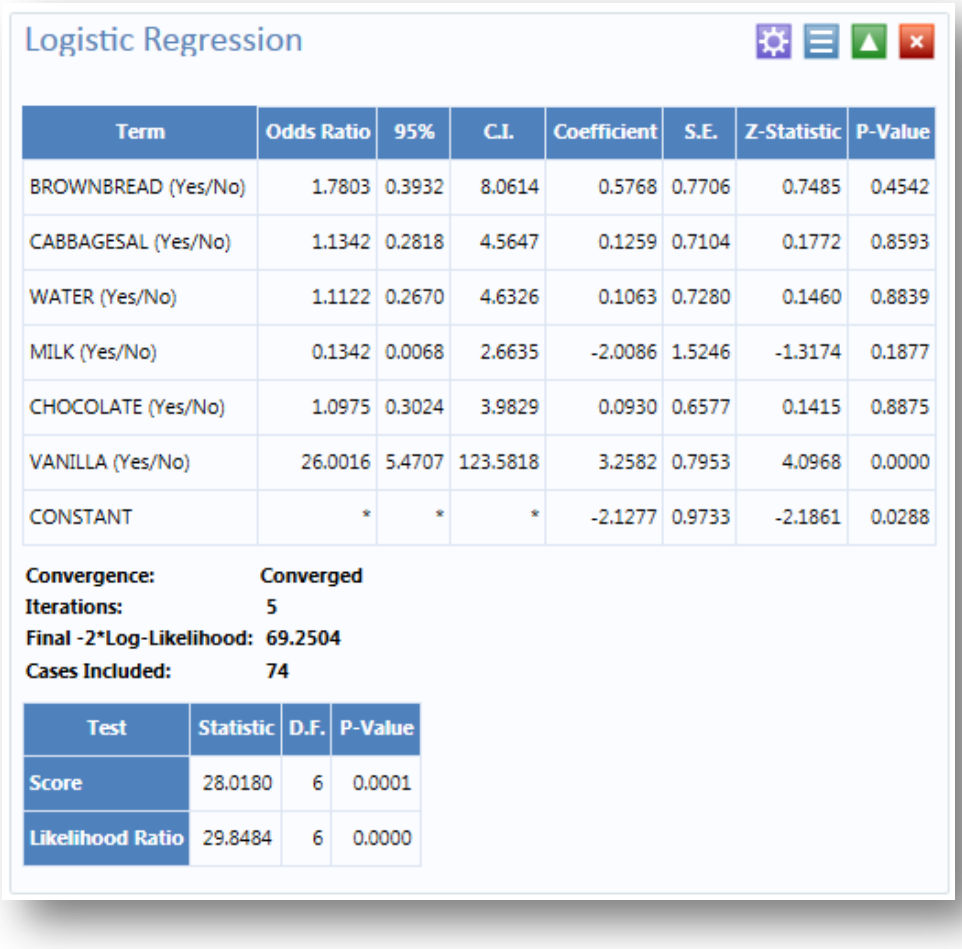
Logistic Regression

In Epi Info™ 7, either the M x N/ 2 x 2 table or Logistic Regression may be used when the outcome variable is dichotomous (for example, Ill- Yes/ Ill- No). However, an M x N/ 2 x 2 analysis is useful only when there is one "risk factor". Logistic regression is useful when the number of explanatory variables ("risk factors") is more than one. Logistic regression shows the relationship between an outcome variable with two values and explanatory variables that can be categorical or continuous. To use Logistic Regression, the dependent (outcome) variable must have a Yes/No value but independent (other variables) can be numeric, categorical, or Yes/No variables.

Records with missing values are excluded from the analyses. If **Include Missing** is used with missing values and Yes/No fields, dummy variables will generate automatically, which contribute Yes vs. Missing and No vs. Missing. Independent variables of text type are automatically turned into dummy variables, which compare each value relative to the lowest value in the sort order. Date or numeric type independent variables are treated as continuous variables unless they are set as dummy variables, which compare each value relative to the lowest value.

In the following example, logistic regression is used to determine the odds ratio of six foods that could be the cause of a hypothetical food borne illness. The dependent variable is Ill, and the independent variables are brownbread, cabbage, water, milk, chocolate, and vanilla.

1. Select the **Sample.PRJ** Data Source. Open the **Oswego** form from the **Data Source Explorer** menu.
2. Click **OK.**
3. Right click on the canvas and select **Add Analysis Gadget > Advanced Statistics > Logistic Regression**. The **Regression Properties** dialog box appears on the Visual Dashboard canvas.
4. From the **Outcome** drop-down list, select **ILL**.
5. From the **Fields** drop-down list, select **BROWNBREAD**, **CABBAGESAL**, **WATER**, **MILK**, **CHOCOLATE**, and **VANILLA**.
6. Click **Run**. Results appear on the Visual Dashboard canvas.



Logistic Regression

Term	Odds Ratio	95%	C.I.	Coefficient	S.E.	Z-Statistic	P-Value
BROWNBREAD (Yes/No)	1.7803	0.3932	8.0614	0.5768	0.7706	0.7485	0.4542
CABBAGESAL (Yes/No)	1.1342	0.2818	4.5647	0.1259	0.7104	0.1772	0.8593
WATER (Yes/No)	1.1122	0.2670	4.6326	0.1063	0.7280	0.1460	0.8839
MILK (Yes/No)	0.1342	0.0068	2.6635	-2.0086	1.5246	-1.3174	0.1877
CHOCOLATE (Yes/No)	1.0975	0.3024	3.9829	0.0930	0.6577	0.1415	0.8875
VANILLA (Yes/No)	26.0016	5.4707	123.5818	3.2582	0.7953	4.0968	0.0000
CONSTANT	*	*	*	-2.1277	0.9733	-2.1861	0.0288

Convergence: Converged
Iterations: 5
Final -2*Log-Likelihood: 69.2504
Cases Included: 74

Test	Statistic	D.F.	P-Value
Score	28.0180	6	0.0001
Likelihood Ratio	29.8484	6	0.0000

Figure 8.71 Logistic Regression Results

The results show that Vanilla has an Odds Ratio and Confidence Interval significantly greater than one. This indicates that consumption of vanilla was likely the cause of food borne illness.

Logistic Regression Properties

- The **Outcome** variable is the dependent variable for the regression. The outcome variable must be numeric or a Yes/No field.
- A **Weight** variable may be selected to use in weighted analyses.
- **Match Variable** identifies the variable indicating the group membership of each record.
- **The Confidence Limits** specifies the probability level at which confidence limits are computed.
- If **No Intercept** is selected, the regression is performed without a constant term.

- The **Include Missing** setting controls independent variables. If **Include Missing** is used with missing values and true/false, dummy variables will be made automatically. This will contribute Yes vs. Missing and No vs. Missing. Independent variables of text type are automatically turned into dummy variables, which compare each value relative to the lowest value in the sort order. Date or numeric type Independent variables are treated as continuous variables unless designated as dummy values through the **Make Dummy** button. If that occurs, they automatically turn into dummy variables, which compare each value relative to the lowest value.
- The **Fields** drop-down list contains the predictor (independent) variables.
- When selected, the predictor variables will appear in the **Other variables** list box. Double click on a variable to remove it from the **Other** variables list box. Select a variable from the **Other variables** list box to activate the **Make Dummy** button. The selected variable will then appear in the **Dummy variable** list box. Double click on a variable to remove it from the **Dummy variable** list box,
- **Interaction terms** are defined with the **Make Interaction** button. Make Interaction appears if two or more variables are selected from the Other Variables list box. If you click **Make Interaction**, the relationship populates the Interaction terms list box. Make Interaction adds all possible combinations of the selected variables to the regression as interaction terms. Double click on a variable to remove it from the **Interaction terms** list box.
- The Clear Terms button clears all variables from the Dummy variables and Interaction Terms list boxes.

Complex Sample Frequencies, Tables, and Means

The Frequency, Table, and Means options in Epi Info™ 7 perform statistical calculations assuming the data were collected using simple random sampling (SRS) or unbiased systematic sampling. More complicated sampling strategies such as stratification, cluster sampling, and the use of unequal sampling fractions are used in many surveys. Visual Dashboard provides three options to analyze complex sample data: Complex Sample Frequencies, Complex Sample Means, and Complex Sample Tables.

Generally, in complex sample analysis, there is a variable for the primary sampling unit (PSU) or Cluster from which a sample subject was selected. If the PSUs were chosen from different Strata (e.g., states or counties), there may be a stratification variable (Stratify by). The concept of sample stratification in complex sample design differs from the concept of stratification during epidemiologic analysis using the TABLES command, as the Strata are chosen in the sampling process before analysis. In addition, a weight variable (Weight) is used when sampling strategies result in unequal selection probabilities. The complex sample commands in Epi Info™ 7 can compute proportions or means with standard errors and confidence limits. If a 2x2 table is requested, the odds ratio, risk ratio, and risk difference are provided.

Complex Sample Frequencies

The Complex Samples Frequencies procedure produces frequency tables for selected variables. The Sample project contains an Expanded Program for Immunization (EPI) cluster survey. Using the EPI method, a team selected 30 communities (i.e., clusters) from the chosen geographic area and visited each of the 30 communities. In each, they selected seven children in an appropriate age range and determined each child's immunization (VAC) status. The following example will determine the frequency of vaccinations using Complex Sample Frequency.

1. Open the **Sample.PRJ** project.
2. Select the **Epi1** form from the **Data Source Explorer** menu.
3. Right click on the canvas to display the menu options.
4. Select **Add Analysis Gadget > Advanced Statistics > Complex Sample Frequencies**.
5. The **Complex Sample Frequency Properties** dialog box appears.

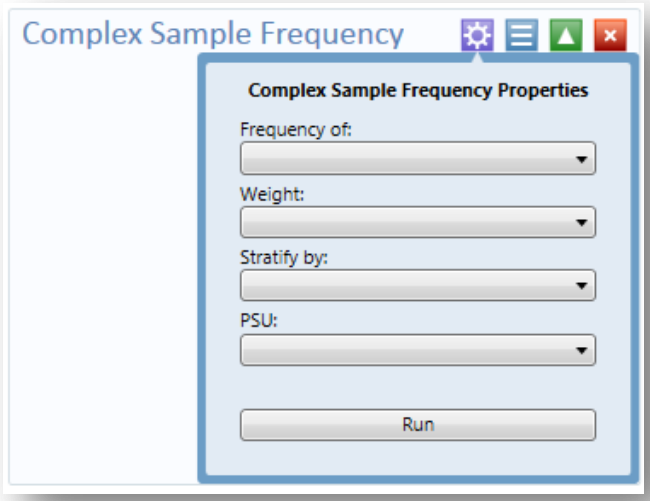
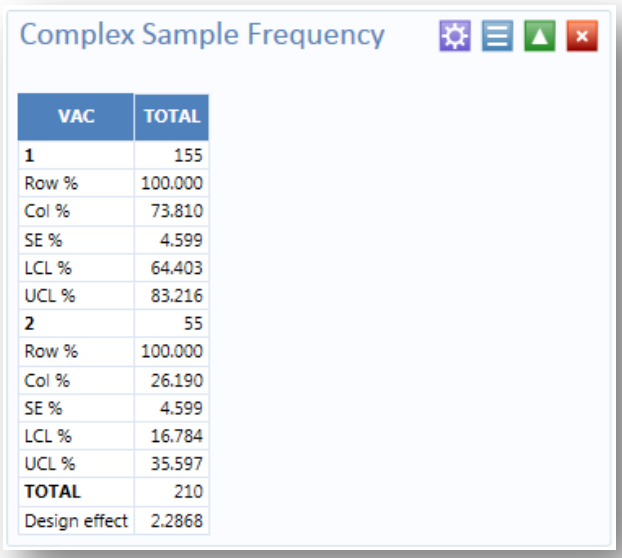


Figure 8.72: Complex Sample Frequency Properties

Complex Sample Frequency Options:

- **Frequency of** identifies the variable(s) whose frequency is computed.
- A **Weight** variable is selected for use in weighted analyses.
- **Stratify by** identifies the variable to be used to stratify or group the frequency data.
- The **PSU** identifies the Primary Sampling Unit.

6. From the **Frequency Of** drop-down list, select **VAC**.
7. From the **PSU** drop-down list, select **Cluster.**
8. Click **Run**.
9. The **Complex Sample Frequency** results appear on the canvas.



VAC	TOTAL
1	155
Row %	100.000
Col %	73.810
SE %	4.599
LCL %	64.403
UCL %	83.216
2	55
Row %	100.000
Col %	26.190
SE %	4.599
LCL %	16.784
UCL %	35.597
TOTAL	210
Design effect	2.2868

Figure 8.73: Complex Sample Frequency Results

Information provided in the output includes:

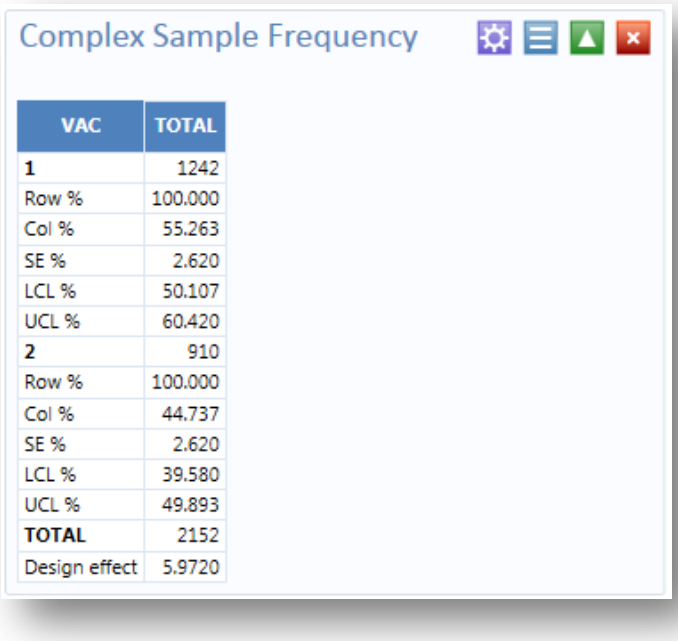
- **Row %** - the row percentage, frequency will always be 100%.
- **Col %** - the column percentage.
- **SE %** - the standard error, which takes into account the complex sample design.
- **LCL %** - Lower Confidence Limit.
- **UCL %** - Upper Confidence Limit.
- **Total** - total number of individuals/elements surveyed.

The results indicate that 73.8% of the 210 children surveyed are vaccinated with a 95% confidence interval range from 64.4 to 83.2.

The following example is similar to the one above, except that this is a stratified cluster survey with a separate 30-cluster survey completed in each of 10 strata. To analyze this dataset correctly, we will take into account where each child lives (LOCATION). We will also use a weight variable to account for the differences in population sizes between the different locations.

1. Open the **Sample.PRJ** project.
2. Select the **Epi10** form from the **Data Source Explorer** menu.
3. Right click on the canvas to display the menu options.
4. Select **Add Analysis Gadget > Advanced Statistics > Complex Sample Frequencies**.
5. The **Complex Sample Frequency Properties** dialog box appears.
6. From the **Frequency Of** drop-down list, select **VAC**.

7. From the **Weight** drop-down list, select **POPW**.
8. From the **Stratify By** drop-down list, select **Location**.
9. From the **PSU** drop-down list, select **Cluster.**
10. Click **Run**.
11. The **Complex Sample Frequency** results appear on the canvas.



VAC	TOTAL
1	1242
Row %	100.000
Col %	55.263
SE %	2.620
LCL %	50.107
UCL %	60.420
2	910
Row %	100.000
Col %	44.737
SE %	2.620
LCL %	39.580
UCL %	49.893
TOTAL	2152
Design effect	5.9720

Figure 8.74: Complex Sample Frequency (Stratified, Weighted) Results

The results indicate that 55.3% of the 2,152 children surveyed are vaccinated with a 95% confidence interval range from 50.1to 60.4.

Complex Sample Means

The Complex Sample Means command can be used when the outcome variable is continuous, such as age, cholesterol level, etc. You can either calculate an overall mean with its measures of variation or compare means across a grouping variable.

As an example of calculating means with a grouping variable, use the Smoke data file located in the Sample project folder. In this example, the investigator is interested in determining if, among smokers, there is a difference in the average number of cigarettes smoked between males and females. In these data, the variable SEX is coded as 1=male and 2=female.

1. Open the **Sample.PRJ** project.
2. Select the **Smoke** form from the **Data Source Explorer** menu.
3. Right click on the canvas to display the menu options.

4. Select **Add Analysis Gadget > Advanced Statistics > Complex Sample Means**.
5. The **Complex Sample Frequency Means** dialog box appears.

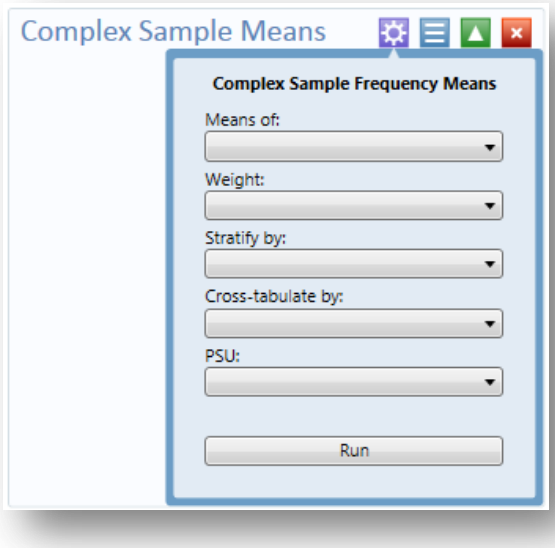
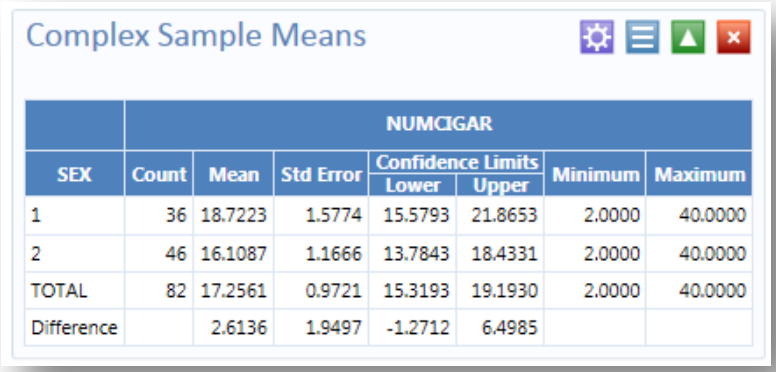


Figure 8.75: Complex Sample Frequency Means

Complex Sample Tables Options:

- **Means of** identifies the variable whose mean is to be computed.
- A **Weight** variable is selected for use in weighted analyses.
- **Stratify by** identifies the variable to be used to stratify or group the frequency data.
- **Cross-Tabulate by** identifies the variable to be used to cross-tabulate the main variable.
- The **PSU** identifies the Primary Sampling Unit.

6. From the **Means Of** drop-down list, select **Numcigar**.
7. From the **Weight** drop-down list, select **SAMPW**.
8. From the **Stratify By** drop-down list, select **Strata**.
9. From the **Cross-tabulate By** drop-down list, select **Sex.**
10. From the **PSU** drop-down list, select **PSUID.**
11. Click **Run**.
12. The **Complex Sample Means** results appear on the canvas.



Complex Sample Means

	NUMCIGAR						
SEX	Count	Mean	Std Error	Confidence Limits		Minimum	Maximum
				Lower	Upper		
1	36	18.7223	1.5774	15.5793	21.8653	2.0000	40.0000
2	46	16.1087	1.1666	13.7843	18.4331	2.0000	40.0000
TOTAL	82	17.2561	0.9721	15.3193	19.1930	2.0000	40.0000
Difference		2.6136	1.9497	-1.2712	6.4985		

Figure 8.76: Complex Sample Means Results

The results indicate that among the 82 individuals who smoked cigarettes, the average number of cigarettes smoked per day for men was 18.7, and 16.1 for women with a 95% confidence interval range of 15.6 to 21.8 for men and 13.7 to 18.4 for women. Note that the Smoke file has 337 individuals. However, the number of cigarettes smoked per day (NUMCIGAR) has data for only the 82 smokers. For nonsmokers this variable was left blank and therefore is treated as missing data and excluded from analysis.

Complex Sample Tables

The Complex Sample Tables option in Visual Dashboard allows you to specify an Exposure Variable and an Outcome Variable. The following example using Complex Sample Tables to show whether the mother received prenatal care (PRENATAL) has an effect on the child's vaccination status. If the mother had received prenatal care, PRENATAL=1 else PRENATAL=2.

1. Open the **Sample.PRJ** project.
2. Select the **Epi10** form from the **Data Source Explorer** menu.
3. Right click on the canvas to display the menu options.
4. Select **Add Analysis Gadget > Advanced Statistics > Complex Sample Tables**.
5. The **Complex Sample Tables Properties** dialog box appears.

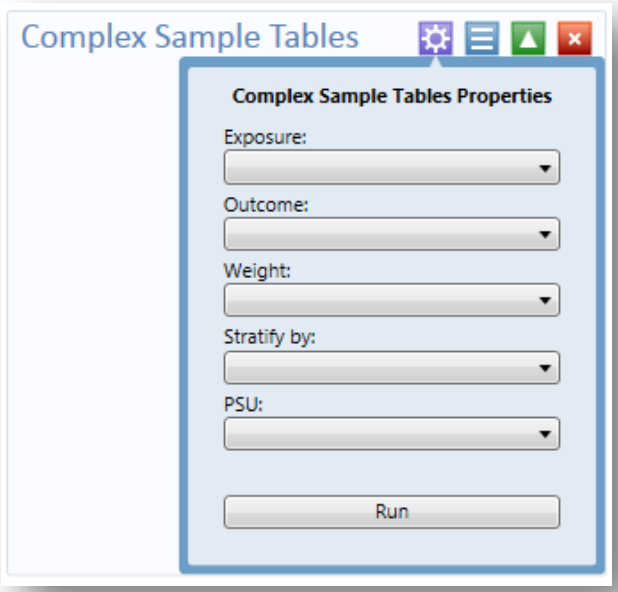
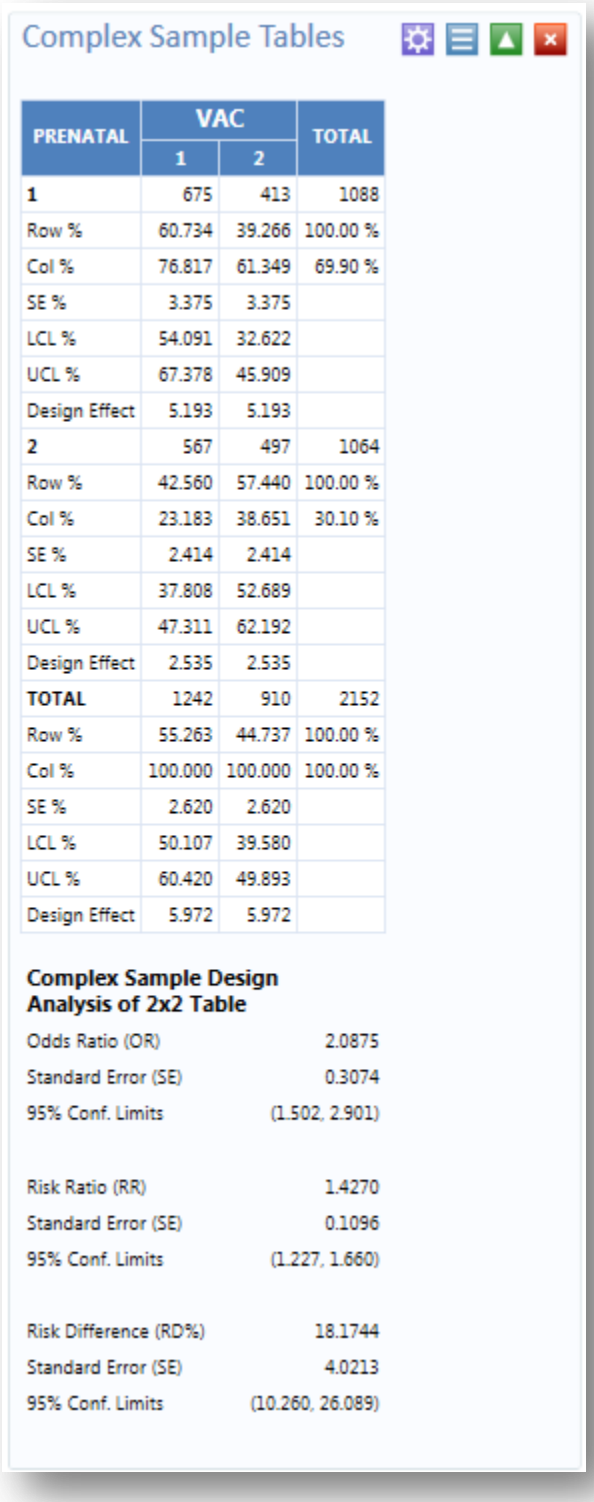


Figure 8.77: Complex Sample Tables Properties

Complex Sample Tables Options:

- **Exposure Variable** identifies the variable that will appear on the horizontal axis of the table. It is considered to be the risk factor (or * for all variables).
- **Outcome Variable** identifies the variable that will appear on the vertical axis of the table.
- A **Weight** variable is selected for use in weighted analyses.
- **Stratify by** identifies the variable to be used to stratify or group the frequency data.
- The **PSU** identifies the Primary Sampling Unit.

6. From the **Exposure** drop-down list, select **Prenatal**.
7. From the **Outcome** drop-down list, select **VAC**.
8. From the **Weight** drop-down list, select **POPW**.
9. From the **Stratify By** drop-down list, select **Location.**
10. From the **PSU** drop-down list, select **Cluster.**
11. Click **Run**.
12. The **Complex Sample Tables** results appear on the canvas.



Complex Sample Tables

PRENATAL	VAC		TOTAL
	1	2	
1	675	413	1088
Row %	60.734	39.266	100.00 %
Col %	76.817	61.349	69.90 %
SE %	3.375	3.375	
LCL %	54.091	32.622	
UCL %	67.378	45.909	
Design Effect	5.193	5.193	
2	567	497	1064
Row %	42.560	57.440	100.00 %
Col %	23.183	38.651	30.10 %
SE %	2.414	2.414	
LCL %	37.808	52.689	
UCL %	47.311	62.192	
Design Effect	2.535	2.535	
TOTAL	1242	910	2152
Row %	55.263	44.737	100.00 %
Col %	100.000	100.000	100.00 %
SE %	2.620	2.620	
LCL %	50.107	39.580	
UCL %	60.420	49.893	
Design Effect	5.972	5.972	

Complex Sample Design Analysis of 2x2 Table

Odds Ratio (OR)	2.0875
Standard Error (SE)	0.3074
95% Conf. Limits	(1.502, 2.901)
Risk Ratio (RR)	1.4270
Standard Error (SE)	0.1096
95% Conf. Limits	(1.227, 1.660)
Risk Difference (RD%)	18.1744
Standard Error (SE)	4.0213
95% Conf. Limits	(10.260, 26.089)

Figure 8.78: Complex Sample Tables Results

The results show that 60.7% of children whose mothers received prenatal care were immunized compared to 42.7% of those children whose mothers did not receive prenatal care.

The 2 x 2 data shows that the odds ratio in the data was 2.088, the risk ratio was 1.427 and this risk difference is 18.2%. The prevalence ratio says that 1.427 times as many children of women who received prenatal care were immunized (60.734% /42.560% = 1.427) compared to children born to women who had not received prenatal care, a 40% difference.

StatCalc Calculator

Refer to the StatCalc Calculator section of this user guide.

NutStat Growth Chart

Refer to the NutStat section of this user guide.

Data Dictionary

Show Data Dictionary

The Data Dictionary displays form(s) and defined variables for an open project. Fields or variables are sorted and displayed by page number in the form. Defined variables appear at the end of the listing. Information retrieved from the form includes Field Name, Prompt, Form, Page, Tab, Data Type, Epi Info Field Type, and Table.

1. Right click on the canvas and select **Show Data Dictionary**.

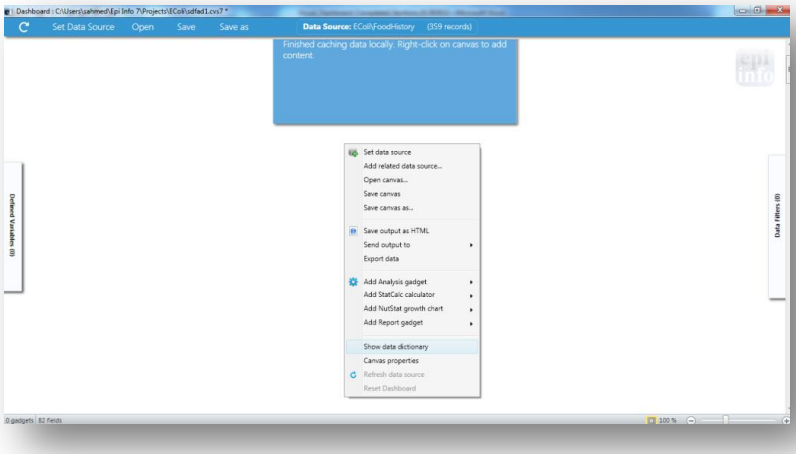
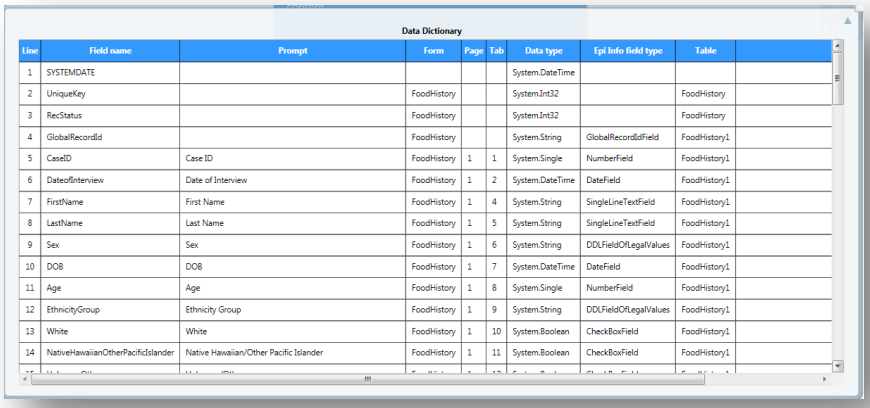


Figure 8.79: Data Dictionary Menu Option

2. The **Data Dictionary** is displayed in **Visual Dashboard**.



Data Dictionary

Line	Field name	Prompt	Form	Page	Tab	Data type	Epi Info field type	Table
1	SYSTEMDATE					System.DateTime		
2	UniqueKey		FoodHistory			System.Int32		FoodHistory
3	RecStatus		FoodHistory			System.Int32		FoodHistory
4	GlobalRecordId		FoodHistory			System.String	GlobalRecordIdField	FoodHistory1
5	CaseID	Case ID	FoodHistory	1	1	System.Single	NumberField	FoodHistory1
6	DateofInterview	Date of Interview	FoodHistory	1	2	System.DateTime	DateField	FoodHistory1
7	FirstName	First Name	FoodHistory	1	4	System.String	SingleLineTextField	FoodHistory1
8	LastName	Last Name	FoodHistory	1	5	System.String	SingleLineTextField	FoodHistory1
9	Sex	Sex	FoodHistory	1	6	System.String	DDLFieldOfLegalValues	FoodHistory1
10	DOB	DOB	FoodHistory	1	7	System.DateTime	DateField	FoodHistory1
11	Age	Age	FoodHistory	1	8	System.Single	NumberField	FoodHistory1
12	EthnicityGroup	Ethnicity Group	FoodHistory	1	9	System.String	DDLFieldOfLegalValues	FoodHistory1
13	White	White	FoodHistory	1	10	System.Boolean	CheckBoxField	FoodHistory1
14	NativeHawaiianOtherPacificIslander	Native Hawaiian/Other Pacific Islander	FoodHistory	1	11	System.Boolean	CheckBoxField	FoodHistory1

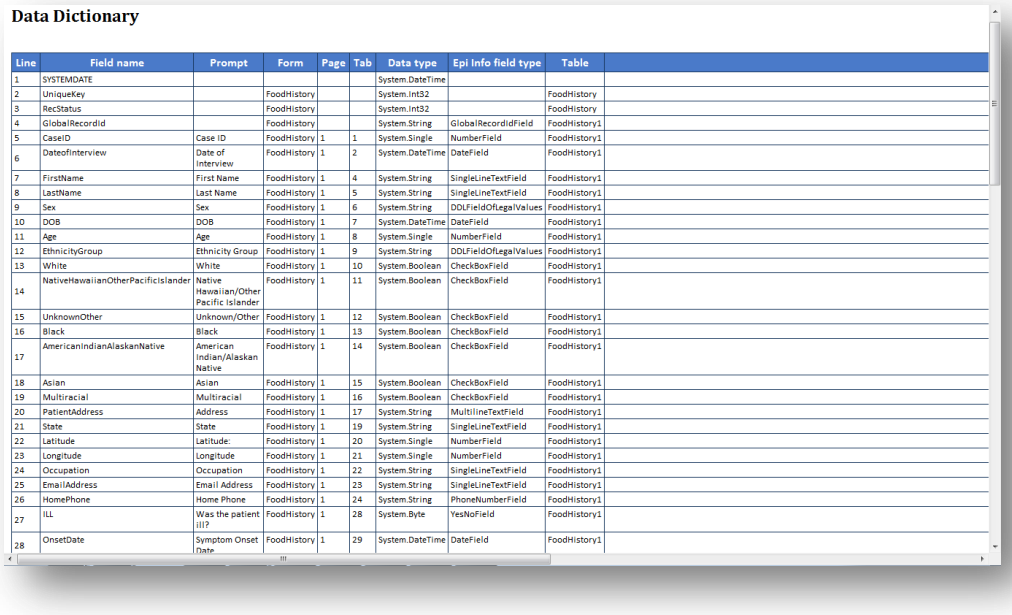
Figure 8.80: Data Dictionary View

Column values for **Prompt**, **Data Type**, **Field Name** and **Epi Info Field type** are developed when fields are created from the **Field Definition** dialog box.

1. To open the **Data Dictionary** as an **HTML** page inside the browser window, right click and then select **Send Data Dictionary to Web Browser**.

From the browser, the data can be printed with **File > Print,** or saved with **File > Save As**.

2. Right click on the **HTML page** to show the pop-up menu. You can export the data directly to an Excel spreadsheet.



Data Dictionary

Line	Field name	Prompt	Form	Page	Tab	Data type	Epi Info field type	Table
1	SYSTEMDATE					System.DateTime		
2	UniqueKey		FoodHistory			System.Int32		FoodHistory
3	RecStatus		FoodHistory			System.Int32		FoodHistory
4	GlobalRecordId		FoodHistory			System.String	GlobalRecordIdField	FoodHistory1
5	CaseID	Case ID	FoodHistory	1	1	System.Single	NumberField	FoodHistory1
6	DateofInterview	Date of Interview	FoodHistory	1	2	System.DateTime	DateField	FoodHistory1
7	FirstName	First Name	FoodHistory	1	4	System.String	SingleLineTextField	FoodHistory1
8	LastName	Last Name	FoodHistory	1	5	System.String	SingleLineTextField	FoodHistory1
9	Sex	Sex	FoodHistory	1	6	System.String	DDLFieldOfLegalValues	FoodHistory1
10	DOB	DOB	FoodHistory	1	7	System.DateTime	DateField	FoodHistory1
11	Age	Age	FoodHistory	1	8	System.Single	NumberField	FoodHistory1
12	EthnicityGroup	Ethnicity Group	FoodHistory	1	9	System.String	DDLFieldOfLegalValues	FoodHistory1
13	White	White	FoodHistory	1	10	System.Boolean	CheckBoxField	FoodHistory1
14	NativeHawaiianOtherPacificIslander	Native Hawaiian/Other Pacific Islander	FoodHistory	1	11	System.Boolean	CheckBoxField	FoodHistory1
15	UnknownOther	Unknown/Other	FoodHistory	1	12	System.Boolean	CheckBoxField	FoodHistory1
16	Black	Black	FoodHistory	1	13	System.Boolean	CheckBoxField	FoodHistory1
17	AmericanIndianAlaskanNative	American Indian/Alaskan Native	FoodHistory	1	14	System.Boolean	CheckBoxField	FoodHistory1
18	Asian	Asian	FoodHistory	1	15	System.Boolean	CheckBoxField	FoodHistory1
19	Multiracial	Multiracial	FoodHistory	1	16	System.Boolean	CheckBoxField	FoodHistory1
20	PatientAddress	Address	FoodHistory	1	17	System.String	MultilineTextField	FoodHistory1
21	State	State	FoodHistory	1	19	System.String	SingleLineTextField	FoodHistory1
22	Latitude	Latitude:	FoodHistory	1	20	System.Single	NumberField	FoodHistory1
23	Longitude	Longitude	FoodHistory	1	21	System.Single	NumberField	FoodHistory1
24	Occupation	Occupation	FoodHistory	1	22	System.String	SingleLineTextField	FoodHistory1
25	EmailAddress	Email Address	FoodHistory	1	23	System.String	SingleLineTextField	FoodHistory1
26	HomePhone	Home Phone	FoodHistory	1	24	System.String	PhoneNumberField	FoodHistory1
27	ILL	Was the patient ill?	FoodHistory	1	28	System.Byte	YesNoField	FoodHistory1
28	OnsetDate	Symptom Onset Date	FoodHistory	1	29	System.DateTime	DateField	FoodHistory1

Figure 8.81: Data Dictionary Export to HTML

3. Click **Close** to exit the **Data Dictionary**.

Note: The Data Dictionary can be refreshed at any time to display the most current data. Right click on the Data Dictionary and select Refresh Data Dictionary.

Report Gadgets

There are several report gadgets available to add text and images to your reports. The **Simple Text box** option allows you to specify several lines of text to appear at the top of the table, frequency, chart, or graph. This is particularly useful for adding a title to charts or graphs. To add a title to your graph:

1. Right click on the **Visual Dashboard canvas**. Select **Add Report Gadget** from the menu options, and then select **Simple Text box**.
2. The text box appears.
3. Enter a title for your graph.

To remove your title:

1. Right click on the **textbox** border.
2. Click **Close this gadget**.

Image Gadget is another report gadget, which allows you to add an image to your charts or graphs.

1. Right click on the **Visual Dashboard canvas**. Select **Add Report Gadget** from the menu options, and then select **Image Gadget**.
2. A light blue box appears on the canvas. Click the **box**.
3. The **Open** dialog box appears. Select the location of your image or enter the **File name** of your image.

Note: You may only select a * .png file.

4. Click **Open**.
5. The image appears on the canvas.

To remove your image:

1. Right click on your image.
2. Click **Close this gadget**.